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PATENT & TRADEMARK OFFICE
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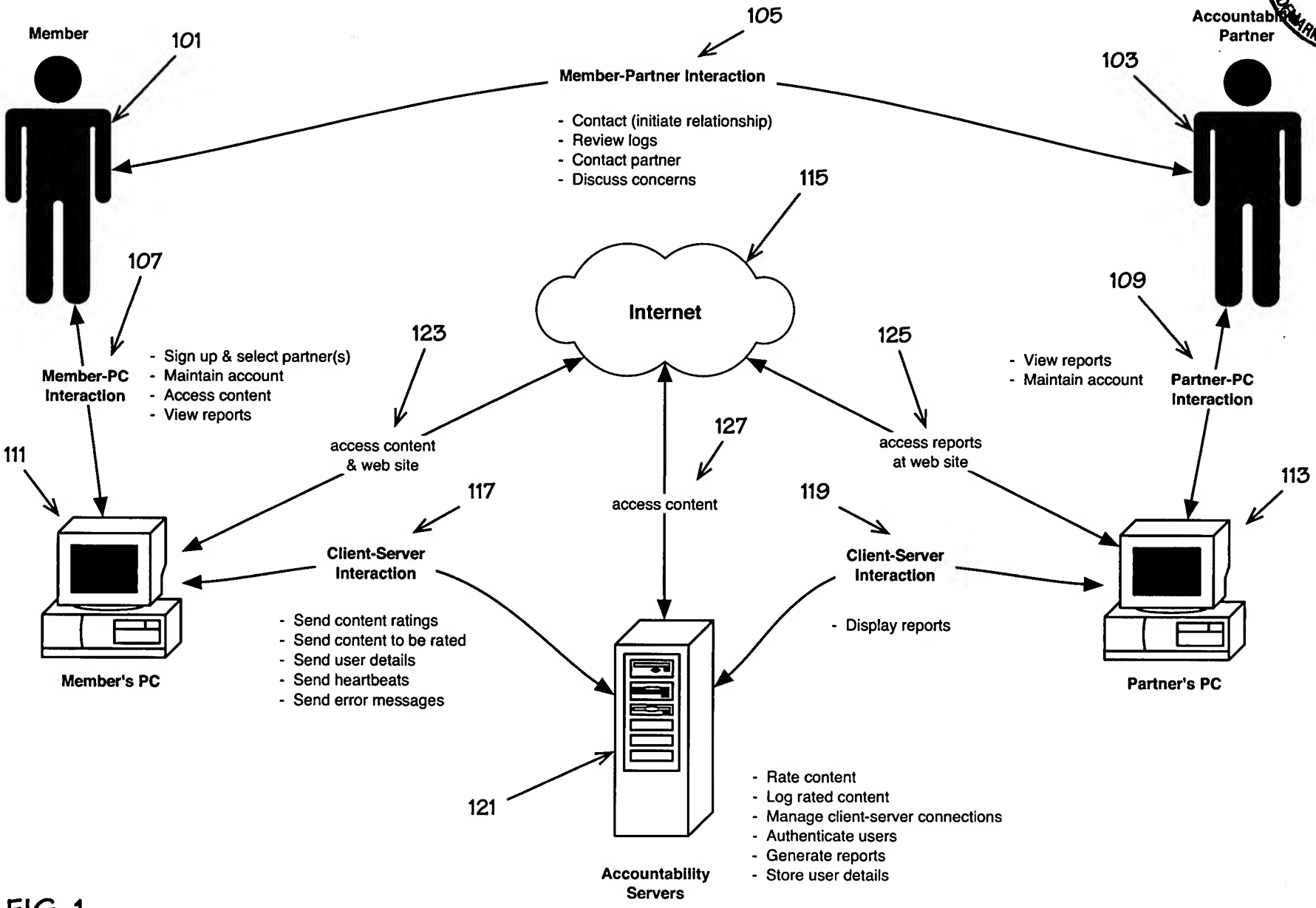


FIG. 1

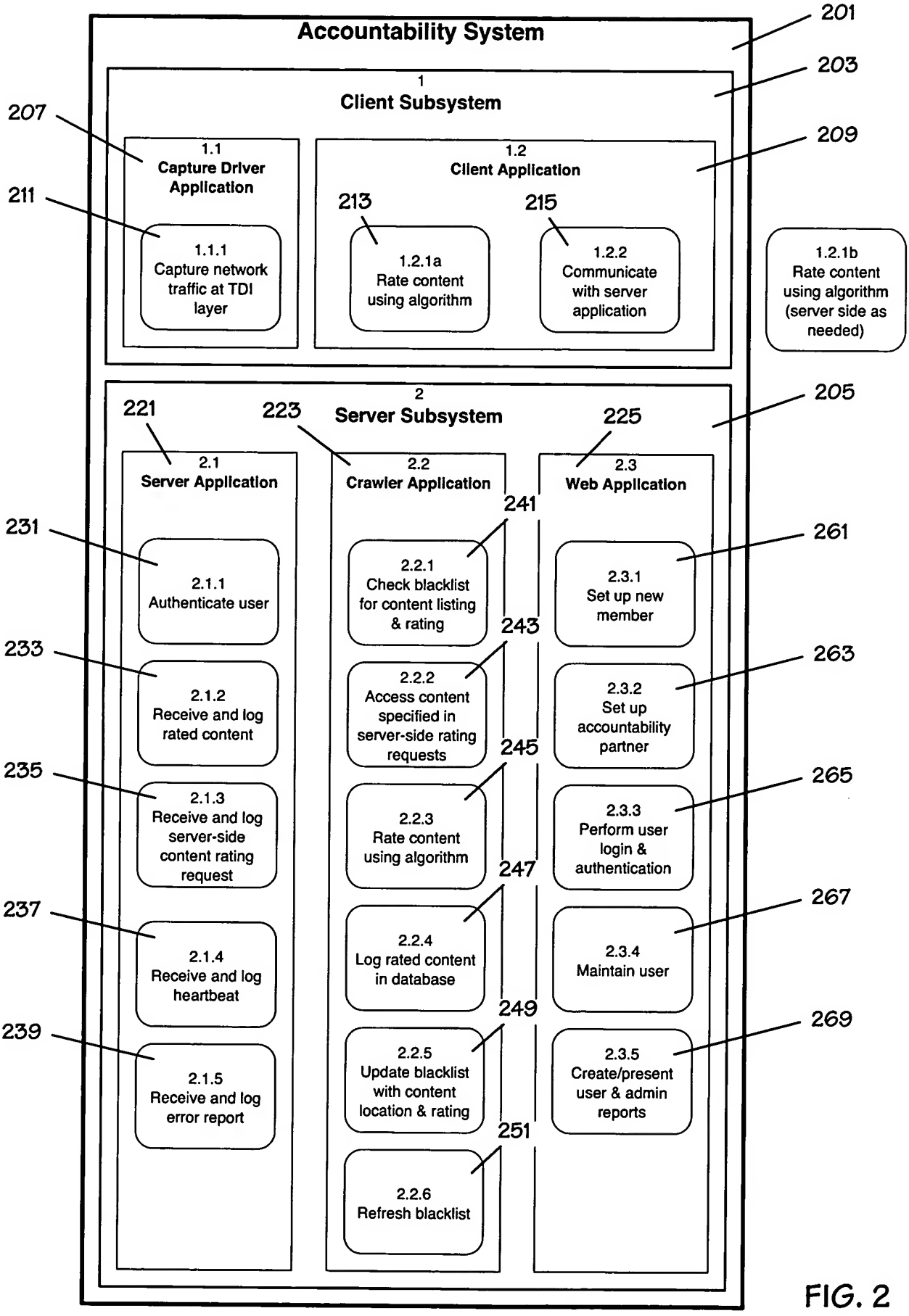

Accountability System
201
1
Client Subsystem
203
207
1.1
Capture Driver Application
209
1.2
Client Application
211
213
215
1.1.1
Capture network traffic at TDI layer
1.2.1a
Rate content using algorithm
1.2.2
Communicate with server application
1.2.1b
Rate content using algorithm (server side as needed)
2
Server Subsystem
205
221
223
225
2.1
Server Application
2.2
Crawler Application
2.3
Web Application
241
231
261
2.1.1
Authenticate user
2.2.1
Check blacklist for content listing & rating
2.3.1
Set up new member
243
233
263
2.1.2
Receive and log rated content
2.2.2
Access content specified in server-side rating requests
2.3.2
Set up accountability partner
245
235
265
2.1.3
Receive and log server-side content rating request
2.2.3
Rate content using algorithm
2.3.3
Perform user login & authentication
247
237
267
2.1.4
Receive and log heartbeat
2.2.4
Log rated content in database
2.3.4
Maintain user
249
239
269
2.1.5
Receive and log error report
2.2.5
Update blacklist with content location & rating
2.3.5
Create/present user & admin reports
251
2.2.6
Refresh blacklist

FIG. 2

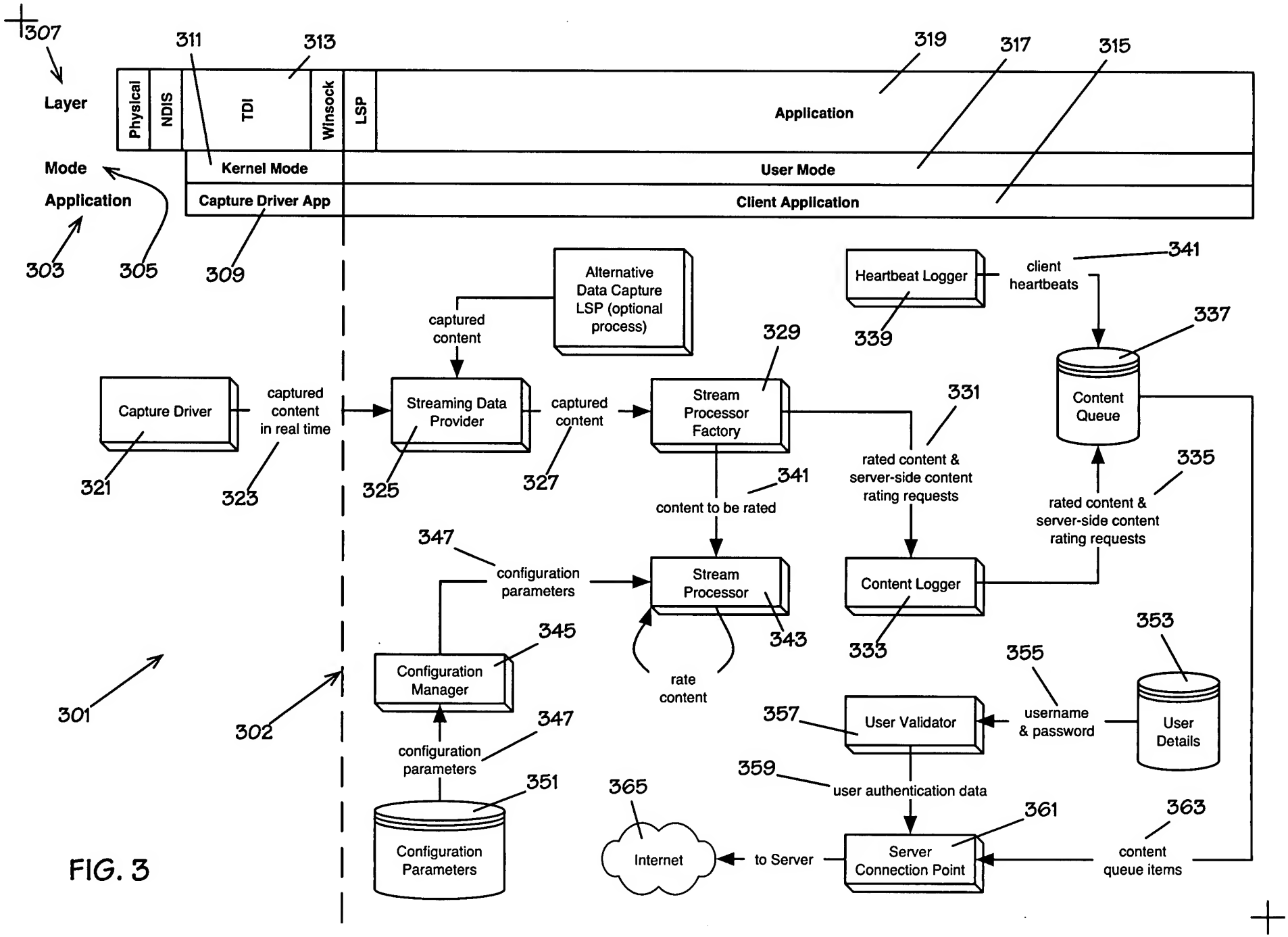
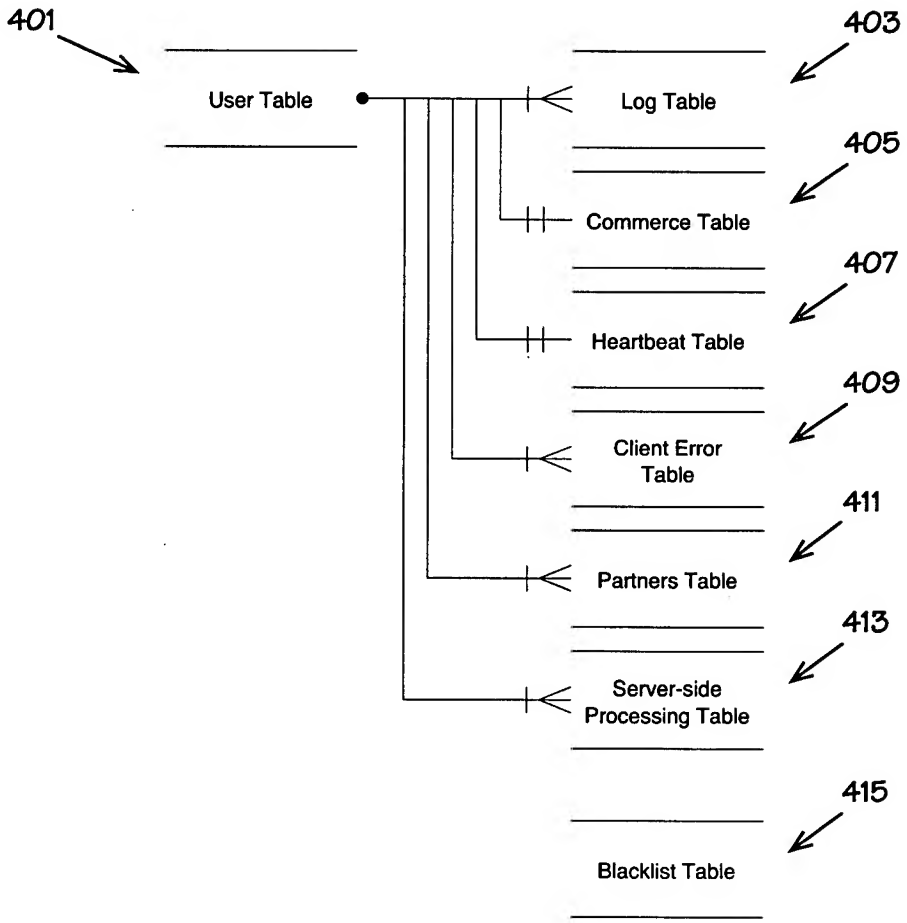
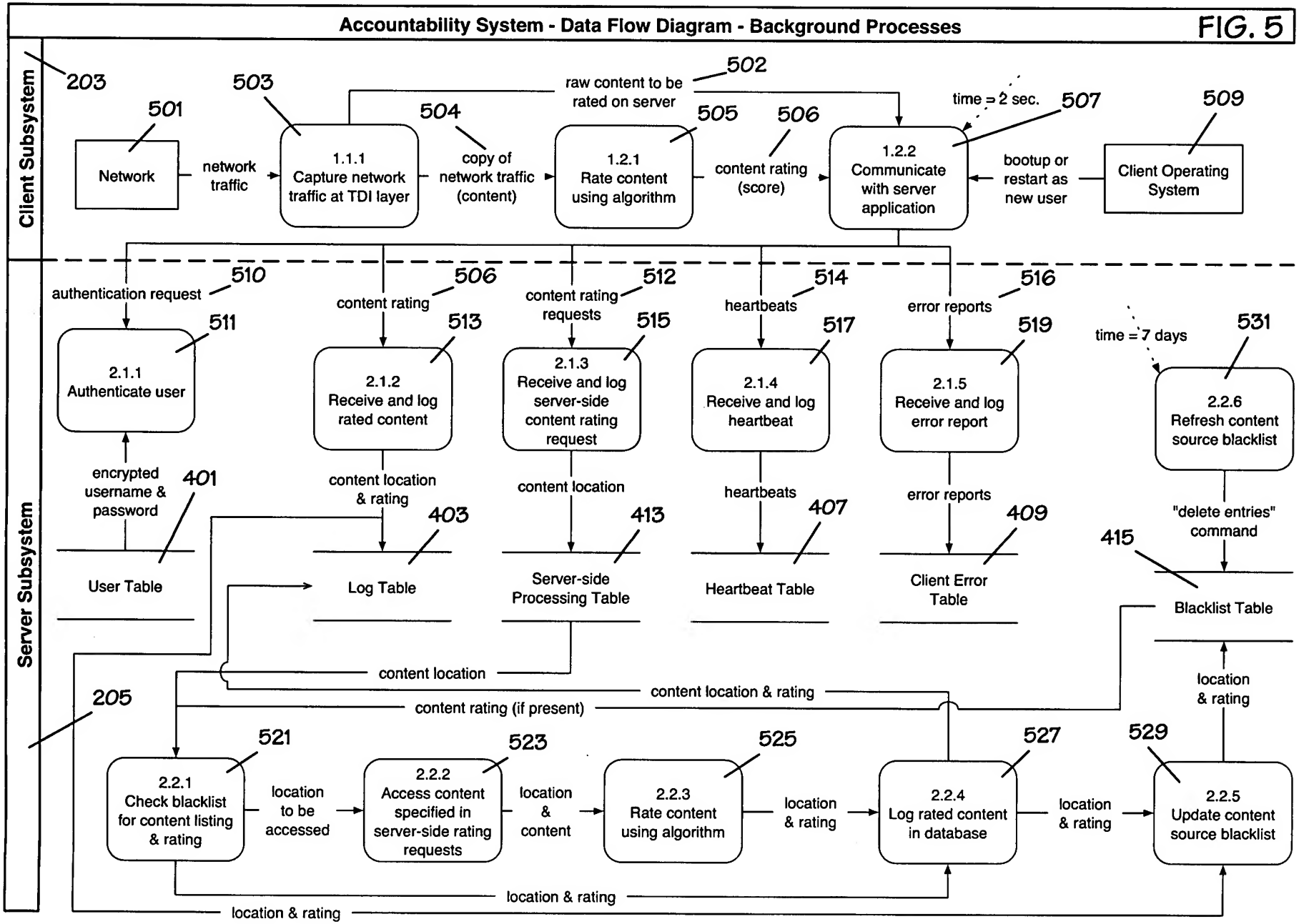

307
Layer
311
313
319
317
315
Physical
NDIS
TDI
Winsock
LSP
Application
Mode
Application
Kernel Mode
User Mode
Capture Driver App
Client Application
303
305
309
Alternative Data Capture LSP (optional process)
captured content
Heartbeat Logger
339
client heartbeats
341
337
Capture Driver
captured content in real time
Streaming Data Provider
captured content
Stream Processor Factory
329
331
Content Queue
321
323
325
327
content to be rated
341
rated content & server-side content rating requests
335
rated content & server-side content rating requests
347
configuration parameters
Stream Processor
Content Logger
343
333
345
353
355
Configuration Manager
rate content
357
User Validator
username & password
User Details
301
302
347
configuration parameters
359
user authentication data
351
365
361
363
Configuration Parameters
Internet
to Server
Server Connection Point
content queue items

FIG. 3

FIG. 4


401
User Table
403
Log Table
405
Commerce Table
407
Heartbeat Table
409
Client Error Table
411
Partners Table
413
Server-side Processing Table
415
Blacklist Table


Accountability System - Data Flow Diagram - Background Processes
FIG. 5
Client Subsystem
Server Subsystem
203
501
Network
network traffic
503
1.1.1 Capture network traffic at TDI layer
504
copy of network traffic (content)
raw content to be rated on server
502
505
1.2.1 Rate content using algorithm
506
content rating (score)
1.2.2 Communicate with server application
time = 2 sec.
507
bootup or restart as new user
509
Client Operating System
authentication request
510
content rating
506
content rating requests
512
heartbeats
514
error reports
516
511
2.1.1 Authenticate user
513
2.1.2 Receive and log rated content
515
2.1.3 Receive and log server-side content rating request
517
2.1.4 Receive and log heartbeat
519
2.1.5 Receive and log error report
time = 7 days
531
2.2.6 Refresh content source blacklist
encrypted username & password
401
content location & rating
403
content location
413
heartbeats
407
error reports
409
"delete entries" command
415
User Table
Log Table
Server-side Processing Table
Heartbeat Table
Client Error Table
Blacklist Table
content location
content location & rating
content rating (if present)
location & rating
205
521
2.2.1 Check blacklist for content listing & rating
location to be accessed
523
2.2.2 Access content specified in server-side rating requests
location & content
525
2.2.3 Rate content using algorithm
location & rating
527
2.2.4 Log rated content in database
location & rating
529
2.2.5 Update content source blacklist
location & rating
location & rating

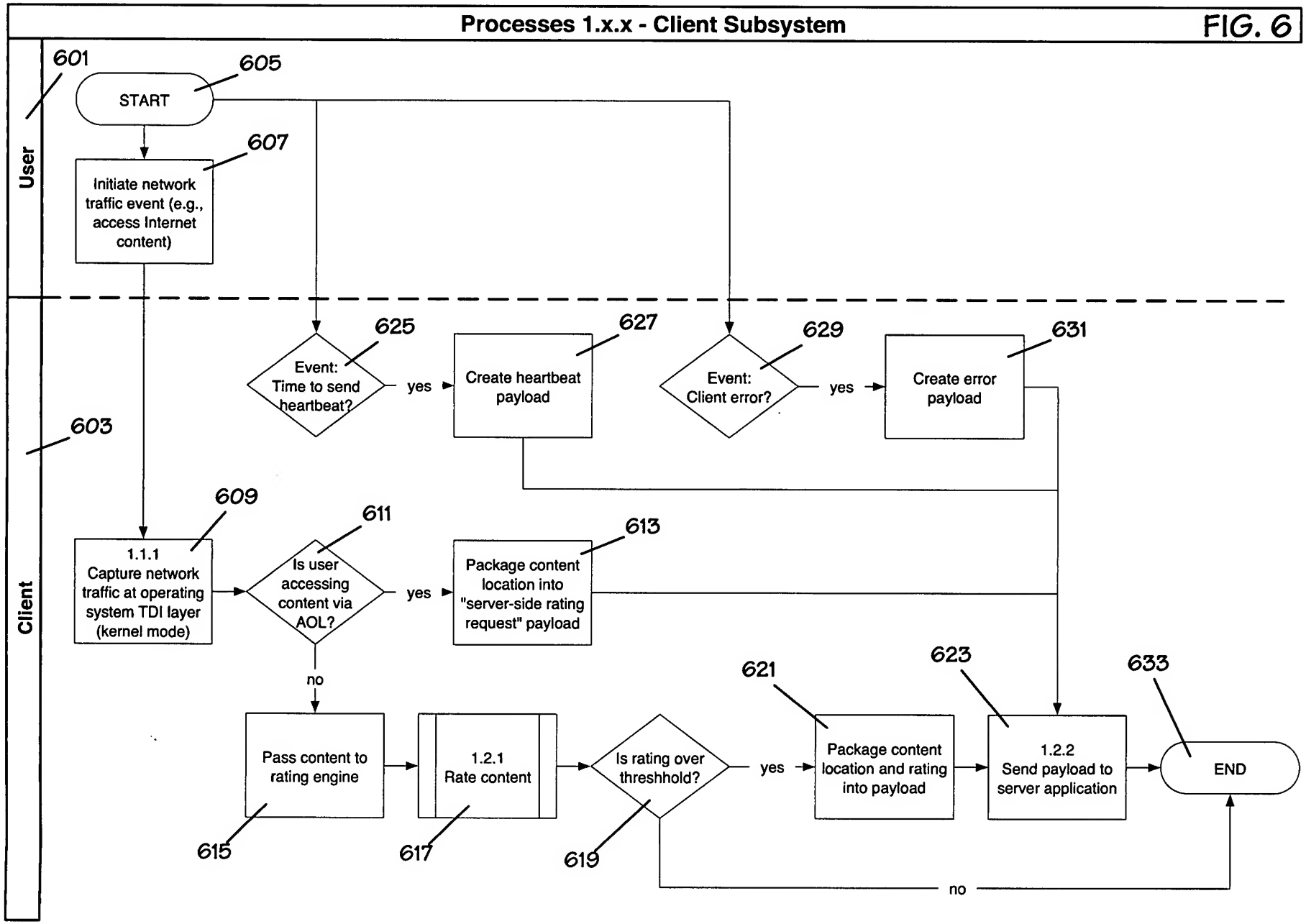
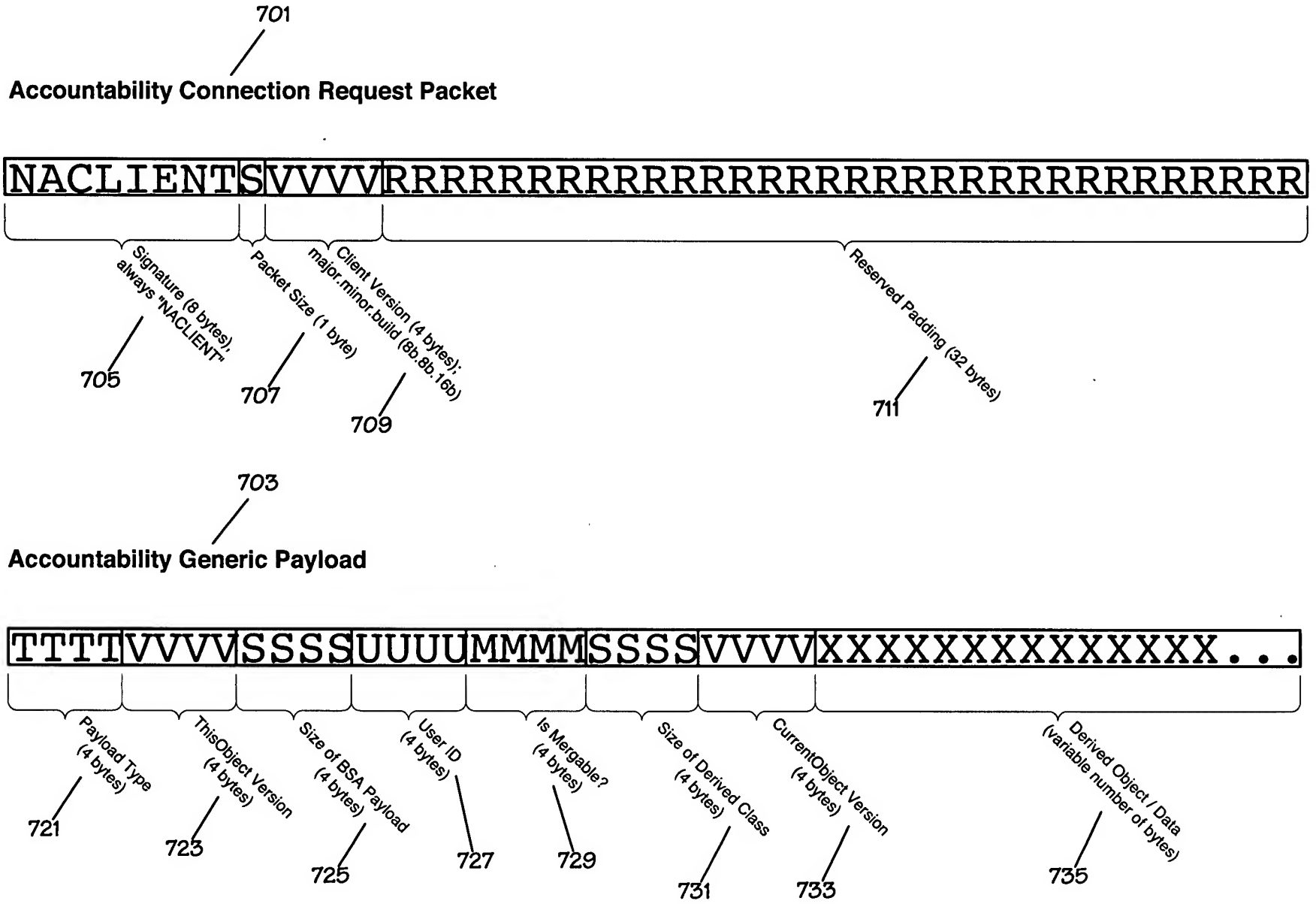
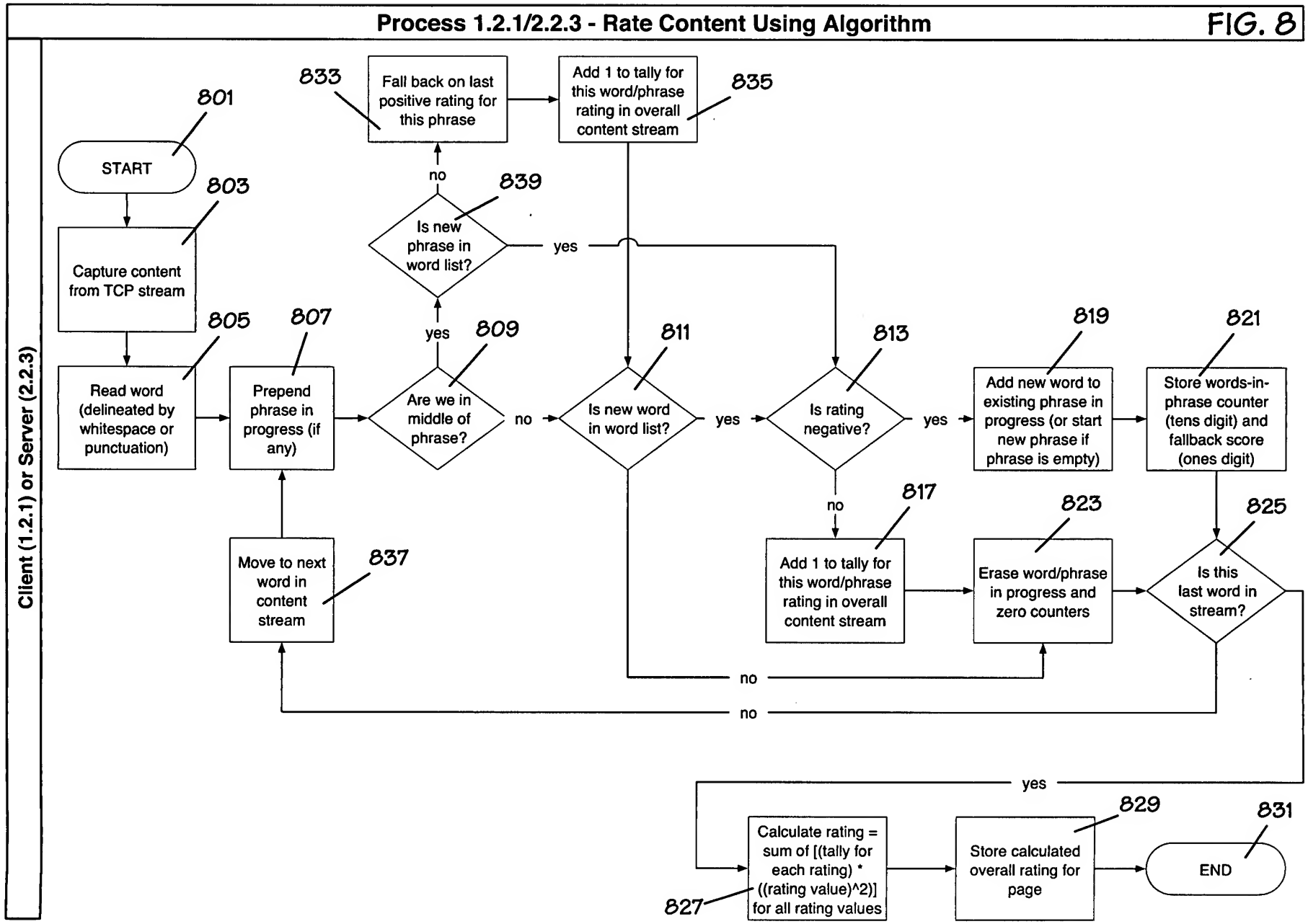
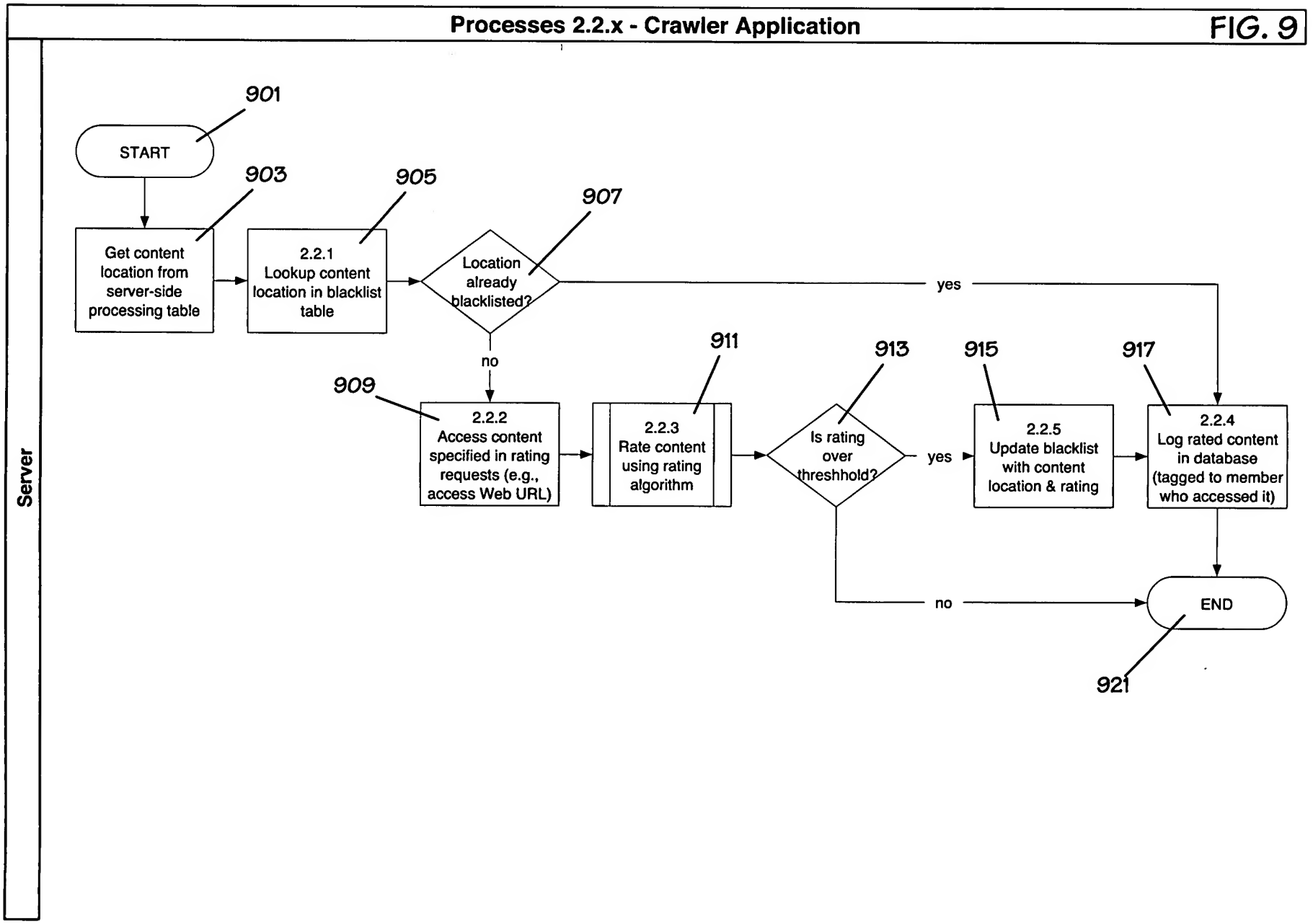
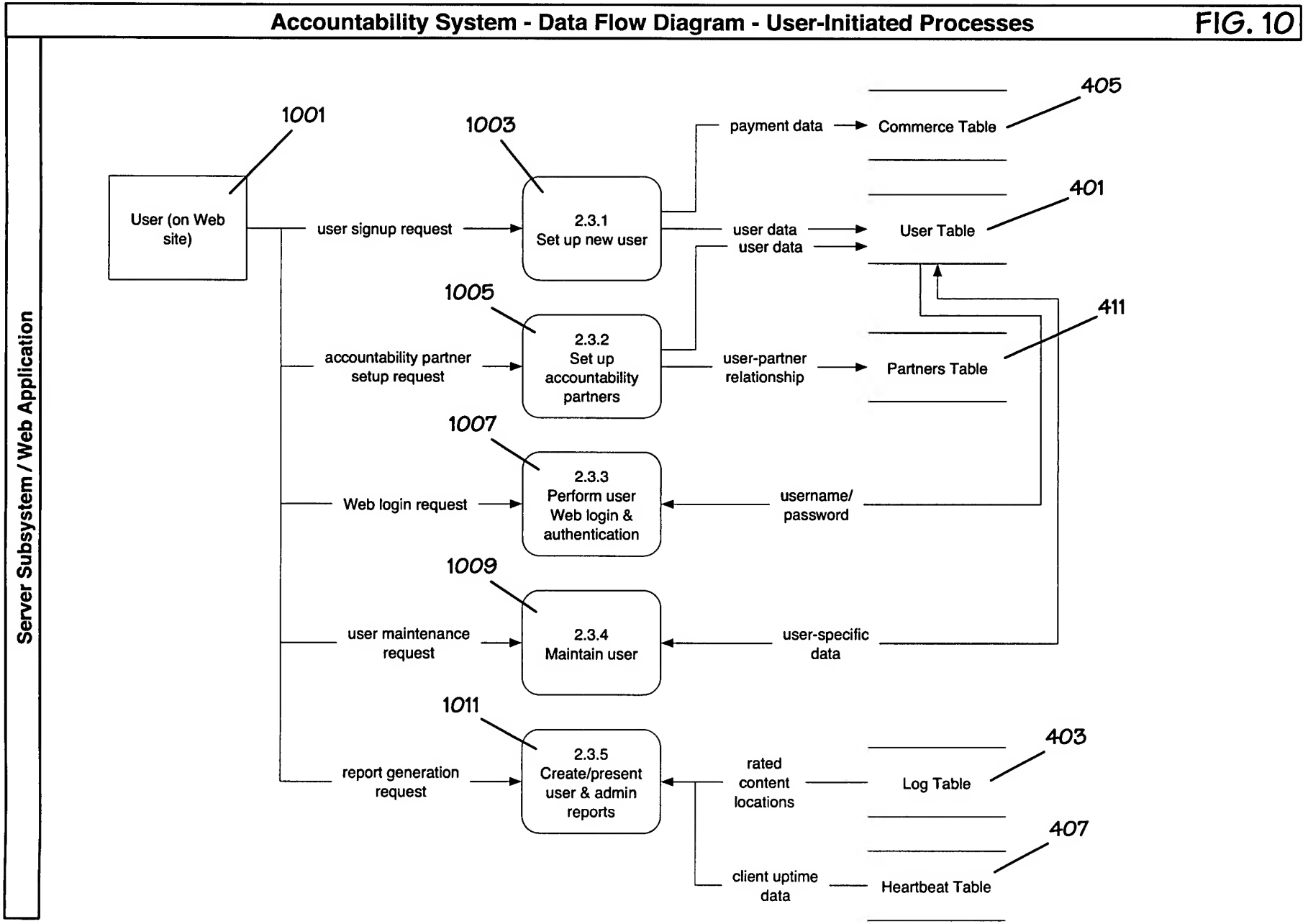

Processes 1.x.x - Client Subsystem
FIG. 6
User
Client
601
603
605
START
607
Initiate network traffic event (e.g., access Internet content)
625
Event: Time to send heartbeat?
yes
627
Create heartbeat payload
629
Event: Client error?
yes
631
Create error payload
609
1.1.1 Capture network traffic at operating system TDI layer (kernel mode)
611
Is user accessing content via AOL?
yes
613
Package content location into "server-side rating request" payload
no
615
Pass content to rating engine
617
1.2.1 Rate content
619
Is rating over threshhold?
yes
621
Package content location and rating into payload
623
1.2.2 Send payload to server application
633
END
no

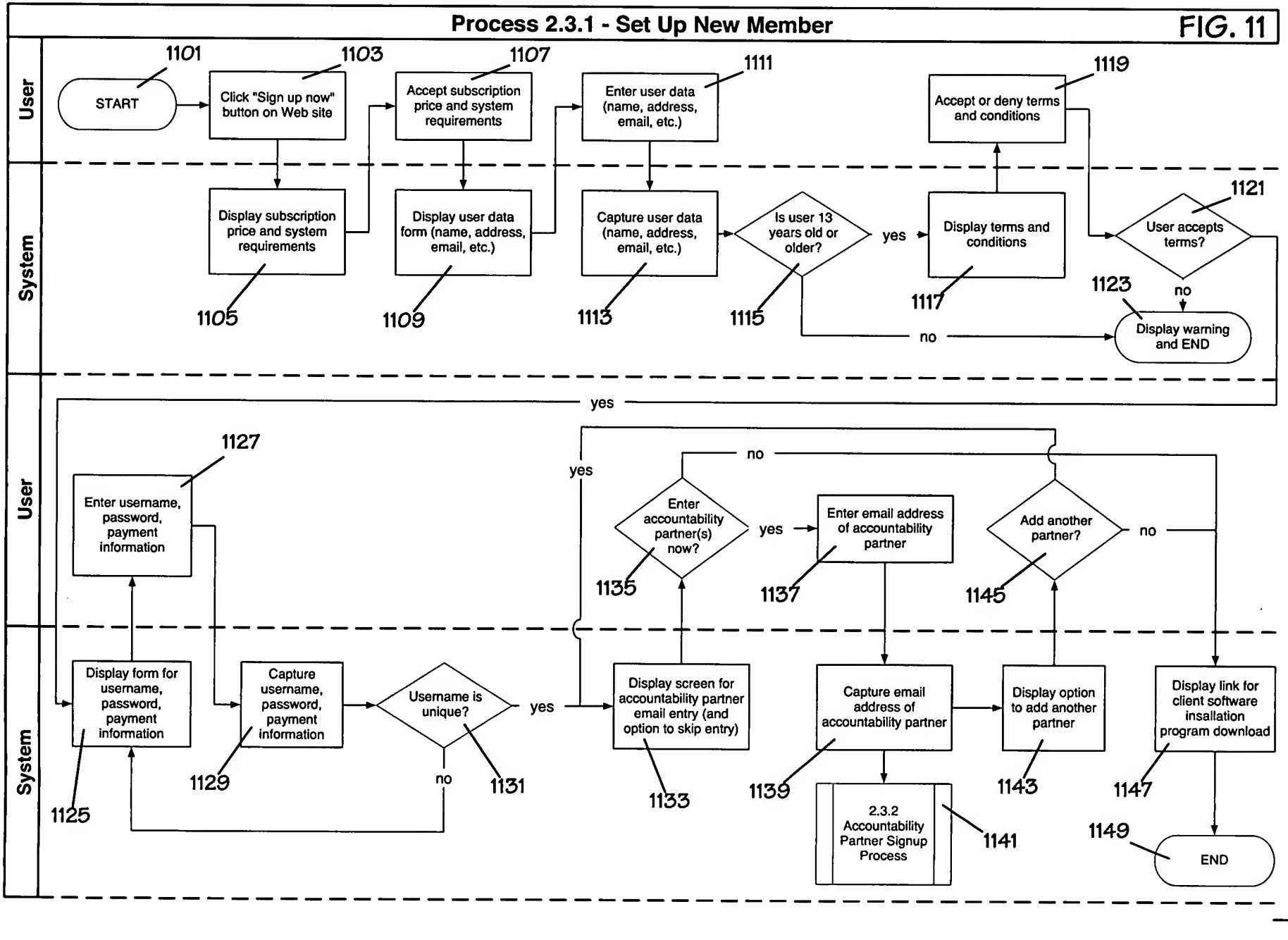
FIG. 7

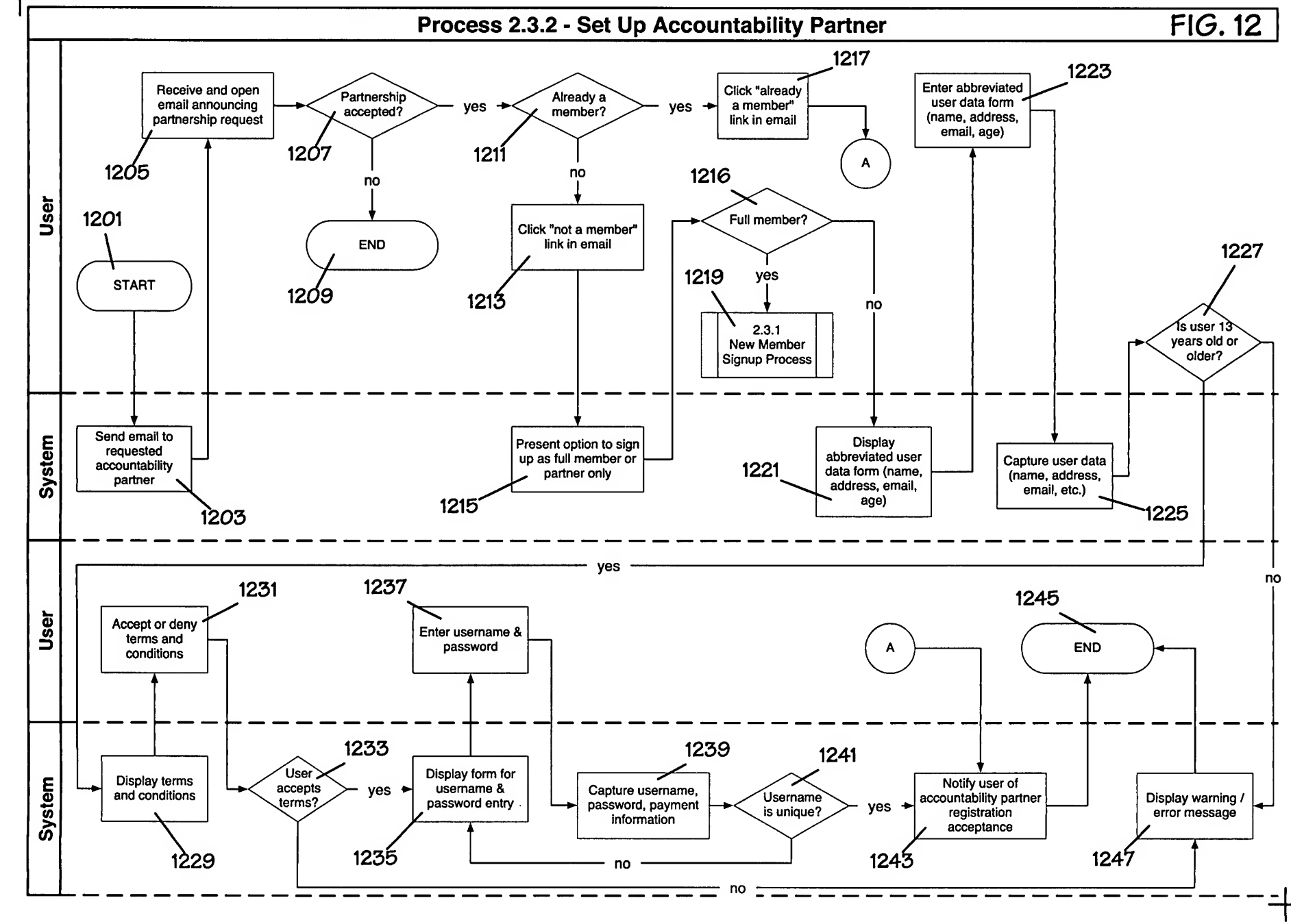

701
Accountability Connection Request Packet
NACLIENTSVVVVRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
Signature (8 bytes), always "NACLIENT"
Packet Size (1 byte)
Client Version (4 bytes); major.minor.build (8b.8b.16b)
Reserved Padding (32 bytes)
705
707
709
711
703
Accountability Generic Payload
TTTTVVVVSSSSUUUUMMMMSSSSVVVVXXXXXXXXXXXXXXX...
Payload Type (4 bytes)
ThisObject Version (4 bytes)
Size of BSA Payload (4 bytes)
User ID (4 bytes)
Is Mergable? (4 bytes)
Size of Derived Class (4 bytes)
CurrentObject Version (4 bytes)
Derived Object / Data (variable number of bytes)
721
723
725
727
729
731
733
735

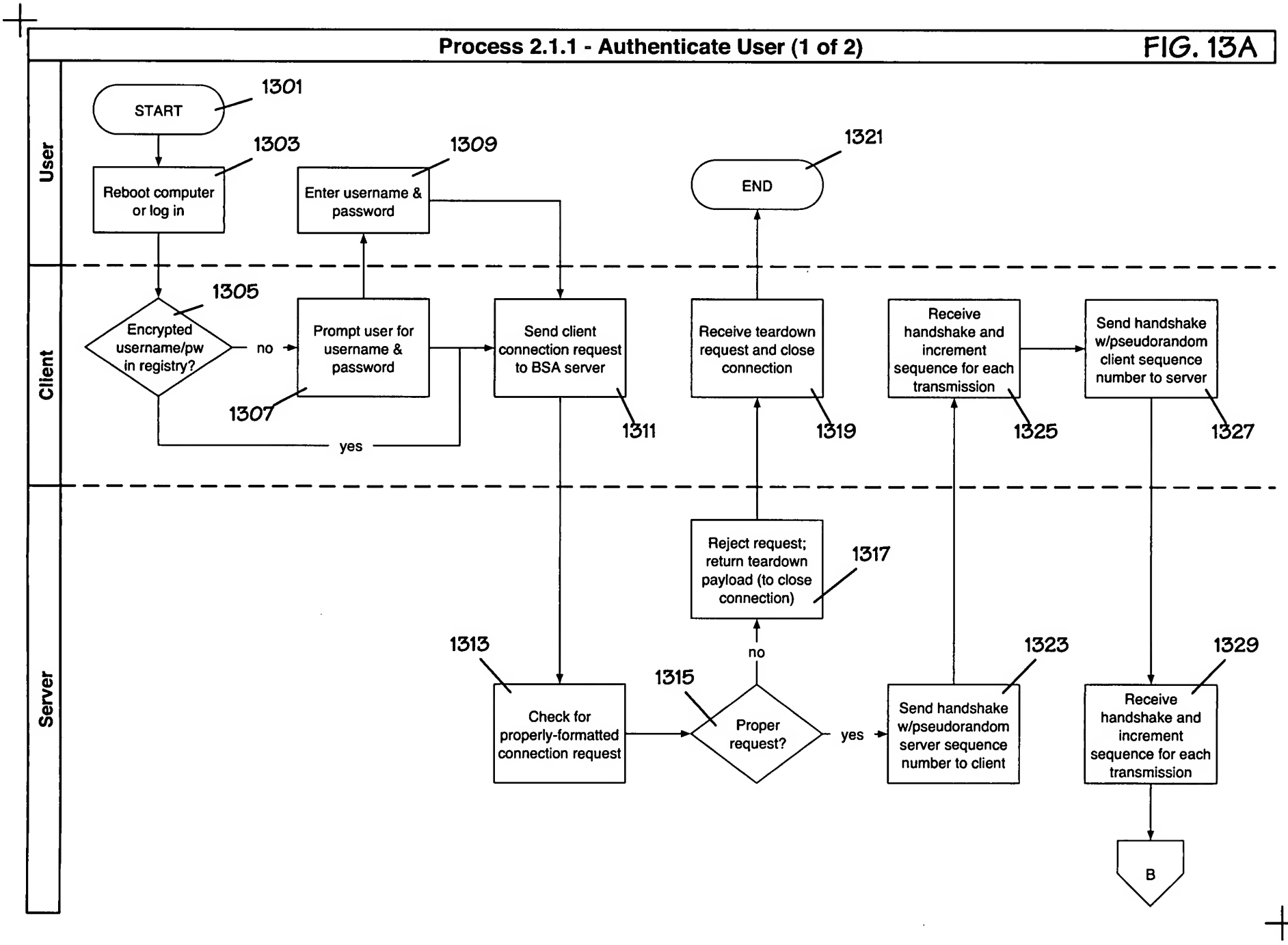

Process 1.2.1/2.2.3 - Rate Content Using Algorithm
FIG. 8
Client (1.2.1) or Server (2.2.3)
801
START
803
Capture content from TCP stream
805
Read word (delineated by whitespace or punctuation)
807
Prepend phrase in progress (if any)
809
Are we in middle of phrase?
no
yes
811
Is new word in word list?
no
yes
813
Is rating negative?
yes
no
819
Add new word to existing phrase in progress (or start new phrase if phrase is empty)
821
Store words-in-phrase counter (tens digit) and fallback score (ones digit)
817
Add 1 to tally for this word/phrase rating in overall content stream
823
Erase word/phrase in progress and zero counters
825
Is this last word in stream?
no
no
837
Move to next word in content stream
833
Fall back on last positive rating for this phrase
835
Add 1 to tally for this word/phrase rating in overall content stream
839
Is new phrase in word list?
no
yes
yes
827
Calculate rating = sum of [(tally for each rating) * ((rating value)^2)] for all rating values
829
Store calculated overall rating for page
831
END

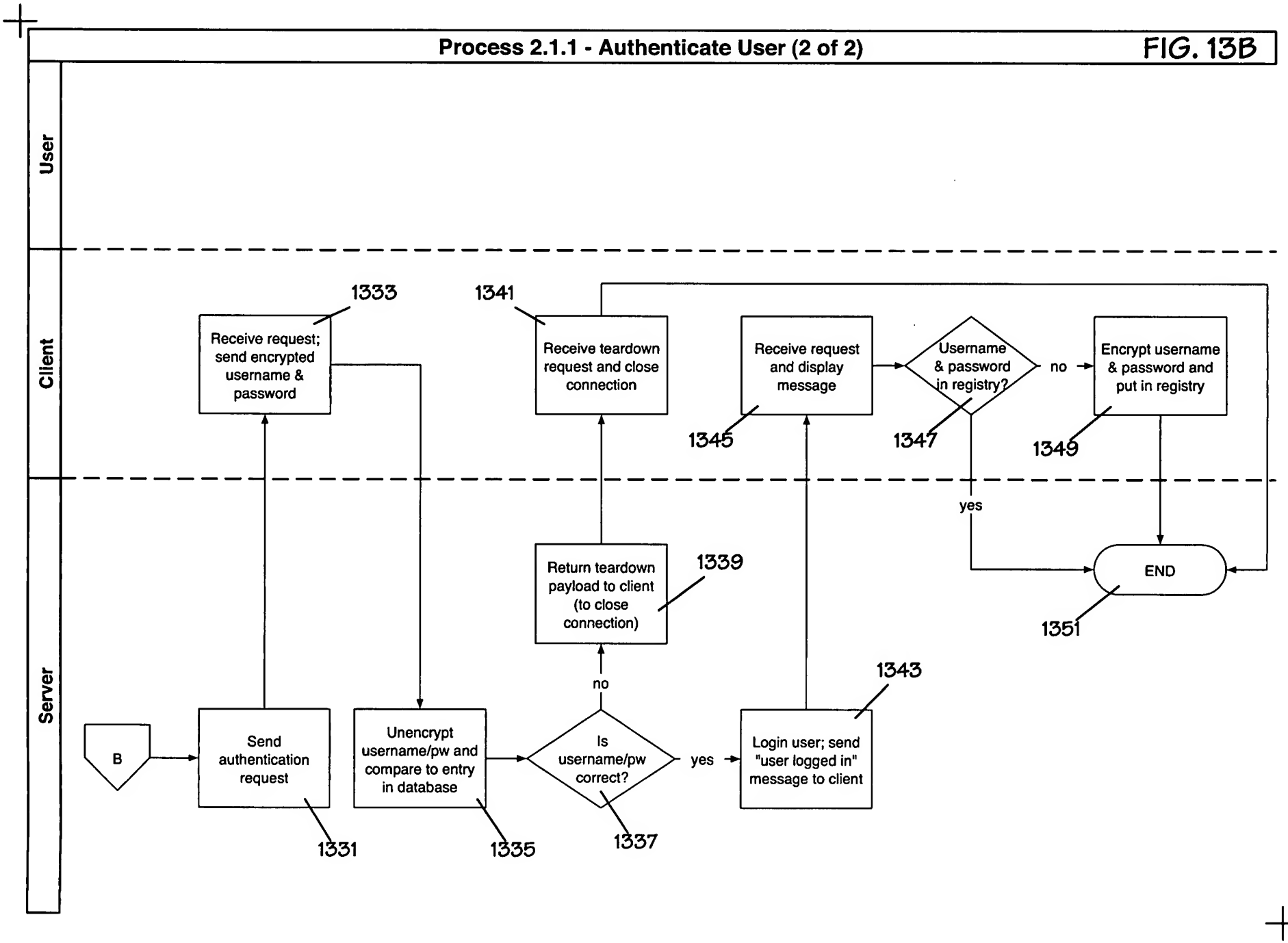

Processes 2.2.x - Crawler Application
FIG. 9
Server
901
START
903
Get content location from server-side processing table
905
2.2.1 Lookup content location in blacklist table
907
Location already blacklisted?
yes
no
909
2.2.2 Access content specified in rating requests (e.g., access Web URL)
911
2.2.3 Rate content using rating algorithm
913
Is rating over threshhold?
yes
915
2.2.5 Update blacklist with content location & rating
917
2.2.4 Log rated content in database (tagged to member who accessed it)
no
END
921


Accountability System - Data Flow Diagram - User-Initiated Processes
FIG. 10
Server Subsystem / Web Application
1001
User (on Web site)
1003
2.3.1 Set up new user
1005
2.3.2 Set up accountability partners
1007
2.3.3 Perform user Web login & authentication
1009
2.3.4 Maintain user
1011
2.3.5 Create/present user & admin reports
user signup request
accountability partner setup request
Web login request
user maintenance request
report generation request
payment data
user data
user data
user-partner relationship
username/ password
user-specific data
rated content locations
client uptime data
405
Commerce Table
401
User Table
411
Partners Table
403
Log Table
407
Heartbeat Table


Process 2.3.1 - Set Up New Member
FIG. 11
User
System
User
System
START
Click "Sign up now" button on Web site
Accept subscription price and system requirements
Enter user data (name, address, email, etc.)
Accept or deny terms and conditions
Display subscription price and system requirements
Display user data form (name, address, email, etc.)
Capture user data (name, address, email, etc.)
Is user 13 years old or older?
yes
Display terms and conditions
User accepts terms?
no
Display warning and END
no
yes
Enter username, password, payment information
Display form for username, password, payment information
Capture username, password, payment information
Username is unique?
yes
no
yes
Enter accountability partner(s) now?
yes
Enter email address of accountability partner
Display screen for accountability partner email entry (and option to skip entry)
Capture email address of accountability partner
2.3.2 Accountability Partner Signup Process
Add another partner?
no
Display option to add another partner
Display link for client software insallation program download
END
1101
1103
1107
1111
1119
1105
1109
1113
1115
1117
1121
1123
1125
1127
1129
1131
1133
1135
1137
1139
1141
1143
1145
1147
1149


Process 2.3.2 - Set Up Accountability Partner
FIG. 12
User
System
User
System
1201
START
1205
Receive and open email announcing partnership request
1207
Partnership accepted?
yes
no
1209
END
1211
Already a member?
yes
no
1213
Click "not a member" link in email
1217
Click "already a member" link in email
A
1216
Full member?
yes
no
1219
2.3.1 New Member Signup Process
1223
Enter abbreviated user data form (name, address, email, age)
1227
Is user 13 years old or older?
yes
no
1203
Send email to requested accountability partner
1215
Present option to sign up as full member or partner only
1221
Display abbreviated user data form (name, address, email, age)
1225
Capture user data (name, address, email, etc.)
1231
Accept or deny terms and conditions
1237
Enter username & password
A
1245
END
1229
Display terms and conditions
1233
User accepts terms?
yes
1235
Display form for username & password entry
1239
Capture username, password, payment information
1241
Username is unique?
yes
no
1243
Notify user of accountability partner registration acceptance
1247
Display warning / error message
no


Process 2.1.1 - Authenticate User (1 of 2)
FIG. 13A
User
Client
Server
START
1301
Reboot computer or log in
1303
Enter username & password
1309
END
1321
Encrypted username/pw in registry?
1305
no
yes
Prompt user for username & password
1307
Send client connection request to BSA server
1311
Receive teardown request and close connection
1319
Receive handshake and increment sequence for each transmission
1325
Send handshake w/pseudorandom client sequence number to server
1327
Reject request; return teardown payload (to close connection)
1317
Check for properly-formatted connection request
1313
Proper request?
1315
no
yes
Send handshake w/pseudorandom server sequence number to client
1323
Receive handshake and increment sequence for each transmission
1329
B


Process 2.1.1 - Authenticate User (2 of 2)
FIG. 13B
User
Client
Server
B
Send authentication request
1331
Receive request; send encrypted username & password
1333
Unencrypt username/pw and compare to entry in database
1335
Is username/pw correct?
1337
no
yes
Return teardown payload to client (to close connection)
1339
Receive teardown request and close connection
1341
Login user; send "user logged in" message to client
1343
Receive request and display message
1345
Username & password in registry?
1347
no
yes
Encrypt username & password and put in registry
1349
END
1351

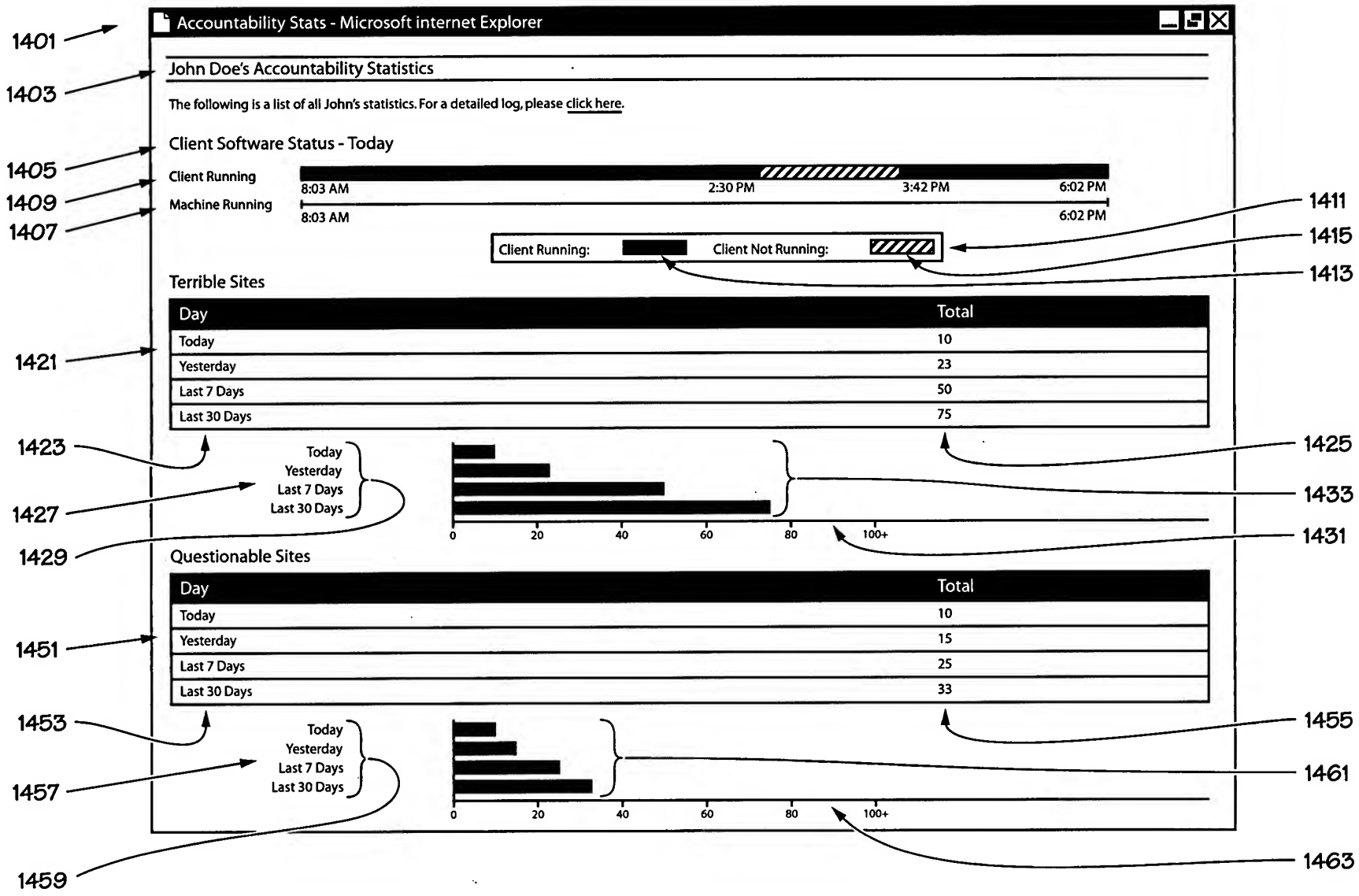

1401
Accountability Stats - Microsoft internet Explorer
1403
John Doe's Accountability Statistics
The following is a list of all John's statistics. For a detailed log, please click here.
Client Software Status - Today
1405
Client Running
1409
Machine Running
1407
8:03 AM
2:30 PM
3:42 PM
6:02 PM
8:03 AM
6:02 PM
1411
1415
Client Running:
Client Not Running:
1413
Terrible Sites
1421
Day
Total
Today
10
Yesterday
23
Last 7 Days
50
Last 30 Days
75
1423
1425
Today
Yesterday
Last 7 Days
Last 30 Days
1427
1433
1429
0
20
40
60
80
100+
1431
Questionable Sites
1451
Day
Total
Today
10
Yesterday
15
Last 7 Days
25
Last 30 Days
33
1453
1455
Today
Yesterday
Last 7 Days
Last 30 Days
1457
1461
0
20
40
60
80
100+
1459
1463

FIG. 14

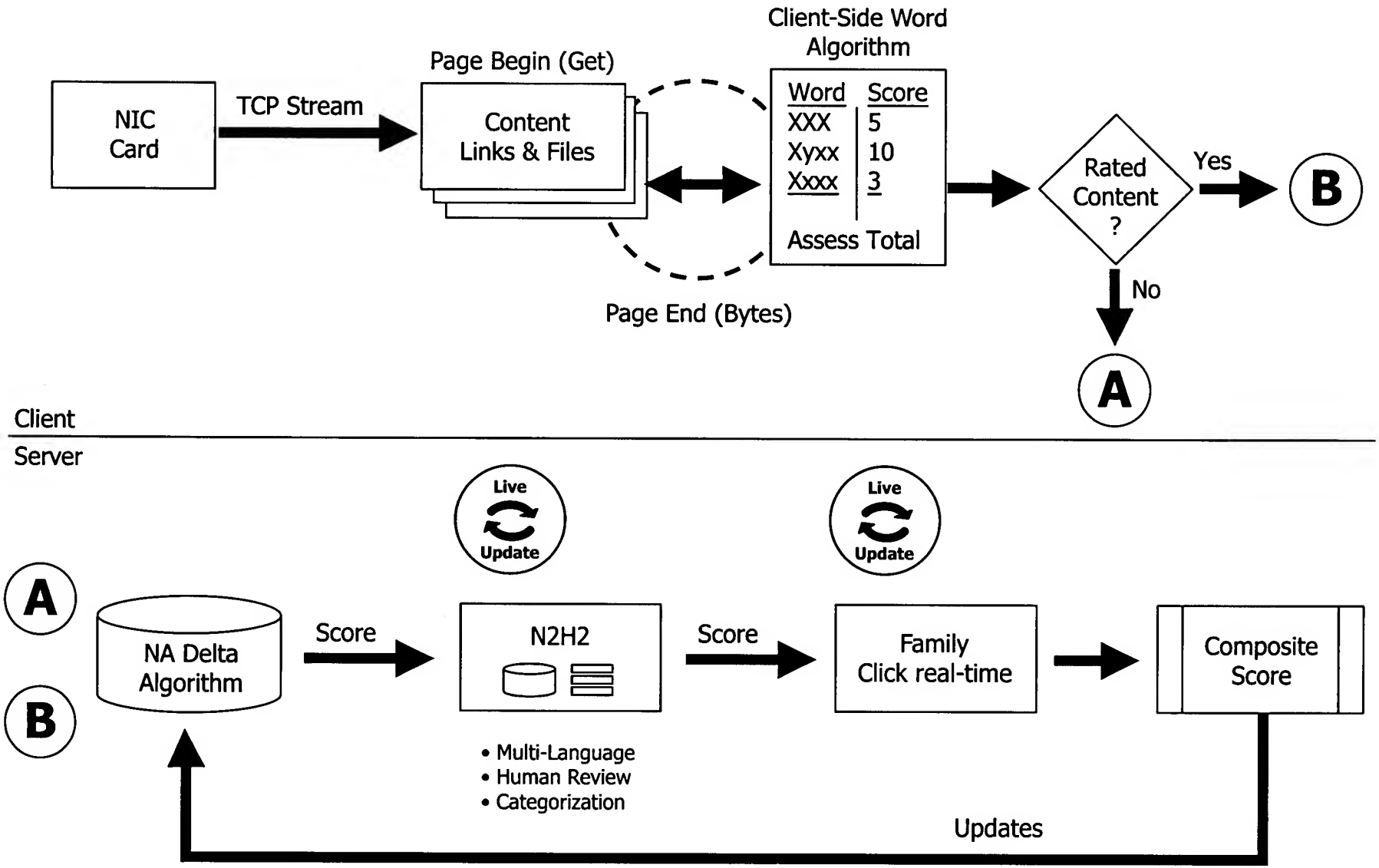

Client-Side Word Algorithm
Page Begin (Get)
NIC Card
TCP Stream
Content Links & Files
Word
Score
XXX
5
Xyxx
10
Xxxx
3
Assess Total
Rated Content ?
Yes
B
No
A
Page End (Bytes)
Client
Server
Live Update
Live Update
A
B
NA Delta Algorithm
Score
N2H2
Score
Family Click real-time
Composite Score
• Multi-Language
• Human Review
• Categorization
Updates

FIG. 15

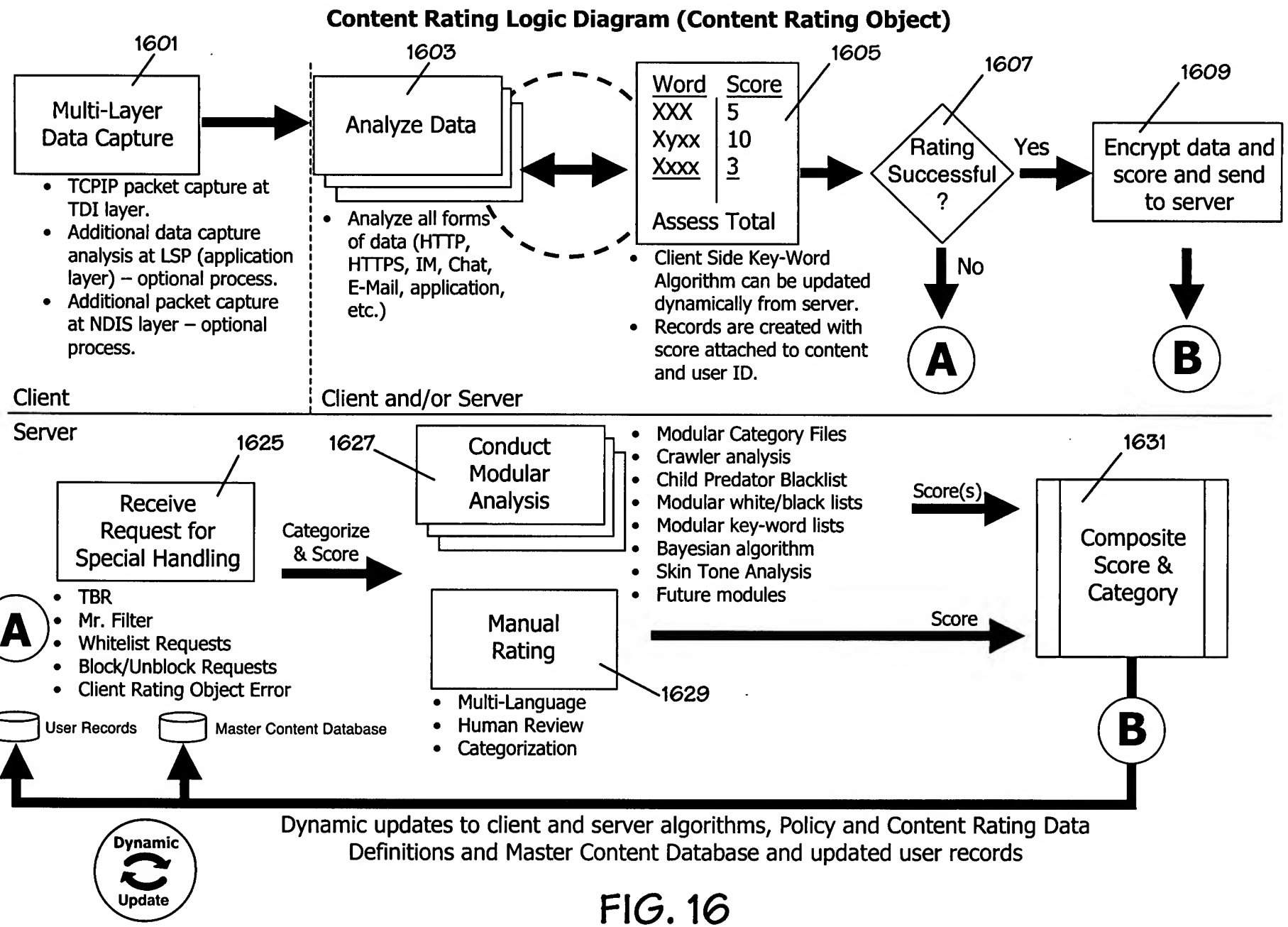

Content Rating Logic Diagram (Content Rating Object)
1601
Multi-Layer Data Capture
TCPIP packet capture at TDI layer.
Additional data capture analysis at LSP (application layer) – optional process.
Additional packet capture at NDIS layer – optional process.
1603
Analyze Data
Analyze all forms of data (HTTP, HTTPS, IM, Chat, E-Mail, application, etc.)
1605
Word Score
XXX 5
Xyxx 10
Xxxx 3
Assess Total
Client Side Key-Word Algorithm can be updated dynamically from server.
Records are created with score attached to content and user ID.
1607
Rating Successful ?
Yes
No
1609
Encrypt data and score and send to server
A
B
Client
Client and/or Server
Server
1625
Receive Request for Special Handling
TBR
Mr. Filter
Whitelist Requests
Block/Unblock Requests
Client Rating Object Error
Categorize & Score
1627
Conduct Modular Analysis
Modular Category Files
Crawler analysis
Child Predator Blacklist
Modular white/black lists
Modular key-word lists
Bayesian algorithm
Skin Tone Analysis
Future modules
Manual Rating
1629
Multi-Language
Human Review
Categorization
Score(s)
Score
1631
Composite Score & Category
User Records
Master Content Database
Dynamic Update
Dynamic updates to client and server algorithms, Policy and Content Rating Data Definitions and Master Content Database and updated user records

FIG. 16

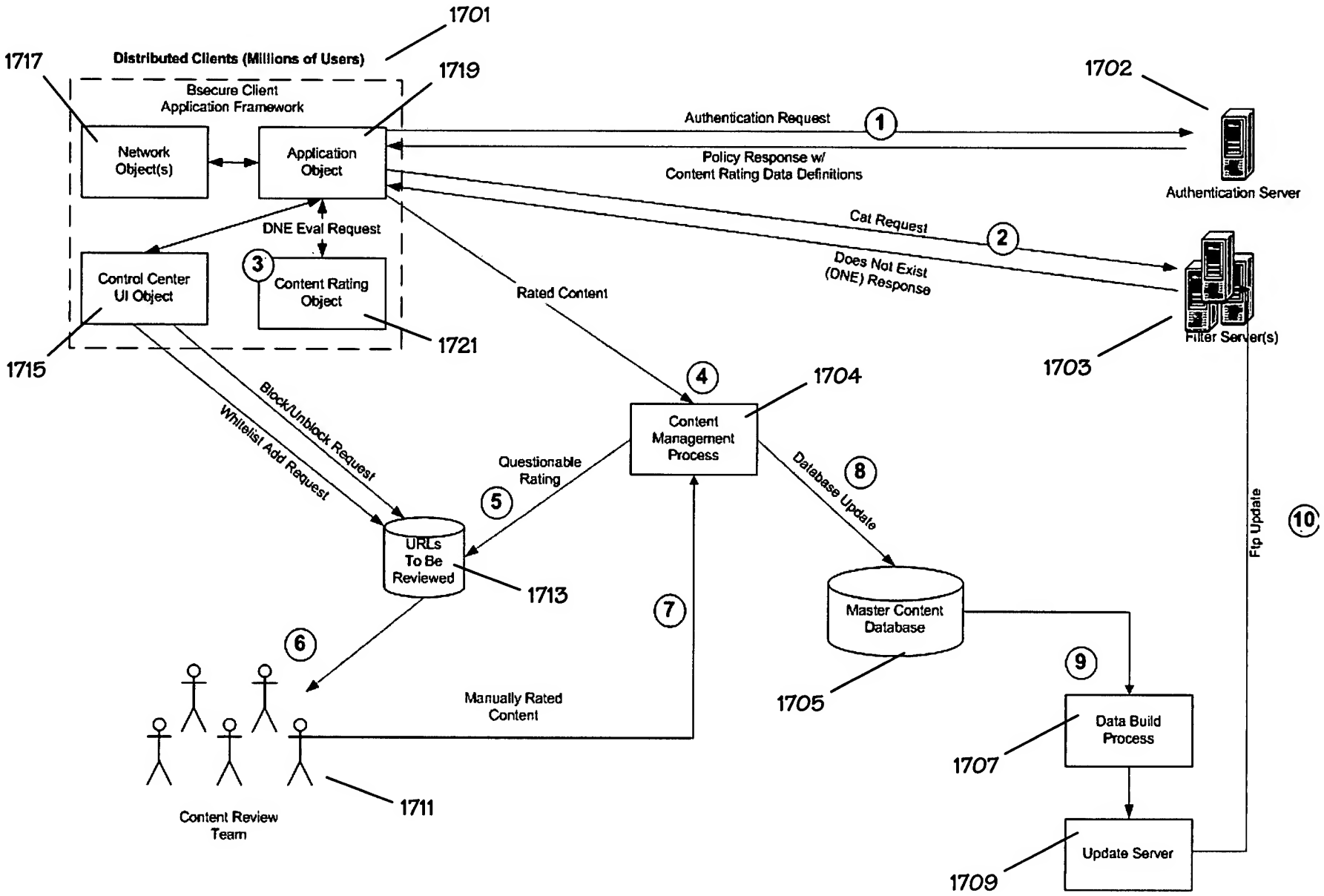

1701
Distributed Clients (Millions of Users)
1717
1719
Bsecure Client
Application Framework
Network Object(s)
Application Object
1702
Authentication Request
1
Policy Response w/
Content Rating Data Definitions
Authentication Server
Cat Request
2
Does Not Exist
(DNE) Response
DNE Eval Request
3
Content Rating Object
Control Center UI Object
1721
1715
Rated Content
Filter Server(s)
1703
4
1704
Content Management Process
Block/Unblock Request
Whitelist Add Request
Questionable Rating
5
8
Database Update
Ftp Update
10
URLs To Be Reviewed
1713
7
Master Content Database
6
9
Manually Rated Content
1705
Data Build Process
1707
Content Review Team
1711
Update Server
1709

FIG. 17

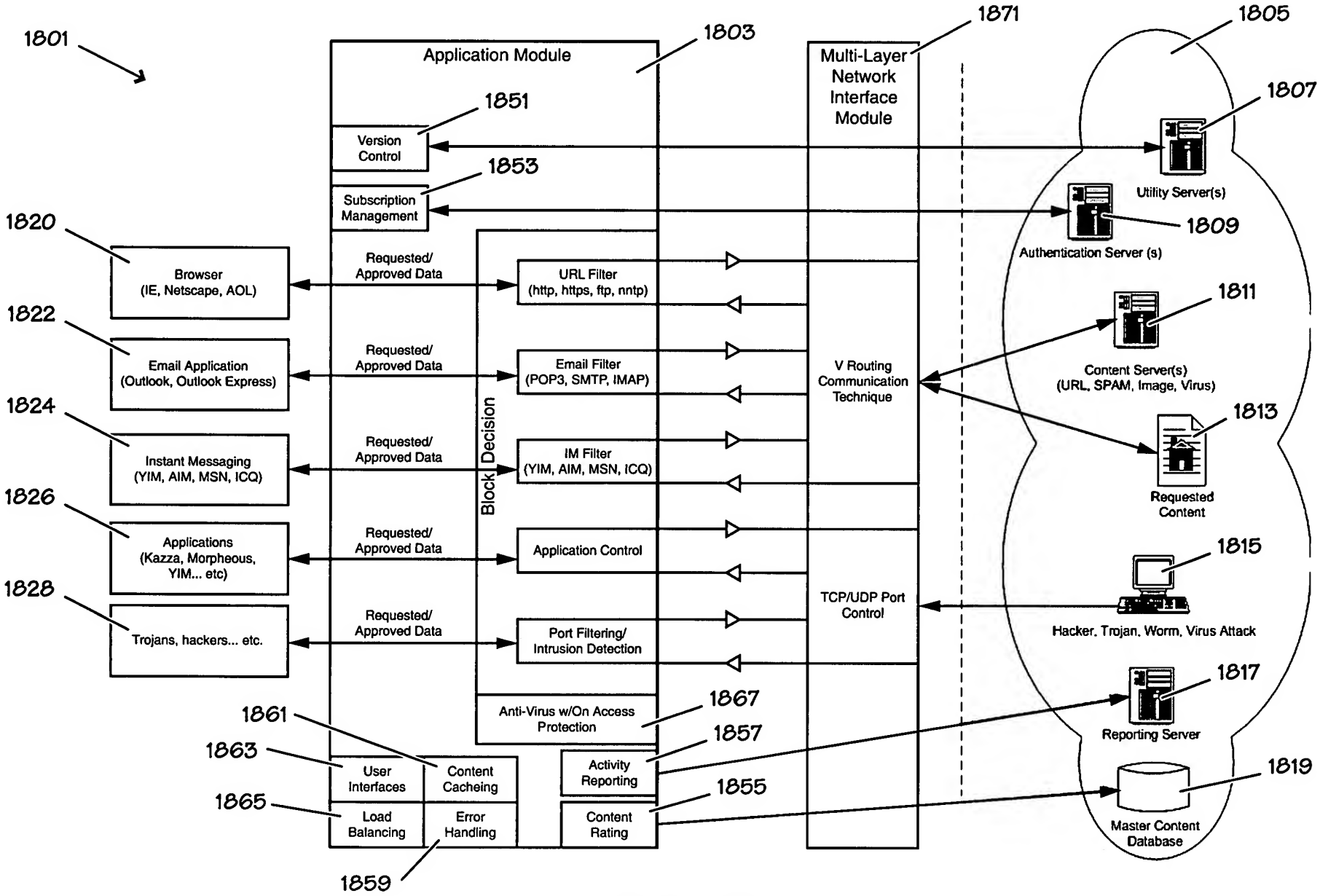
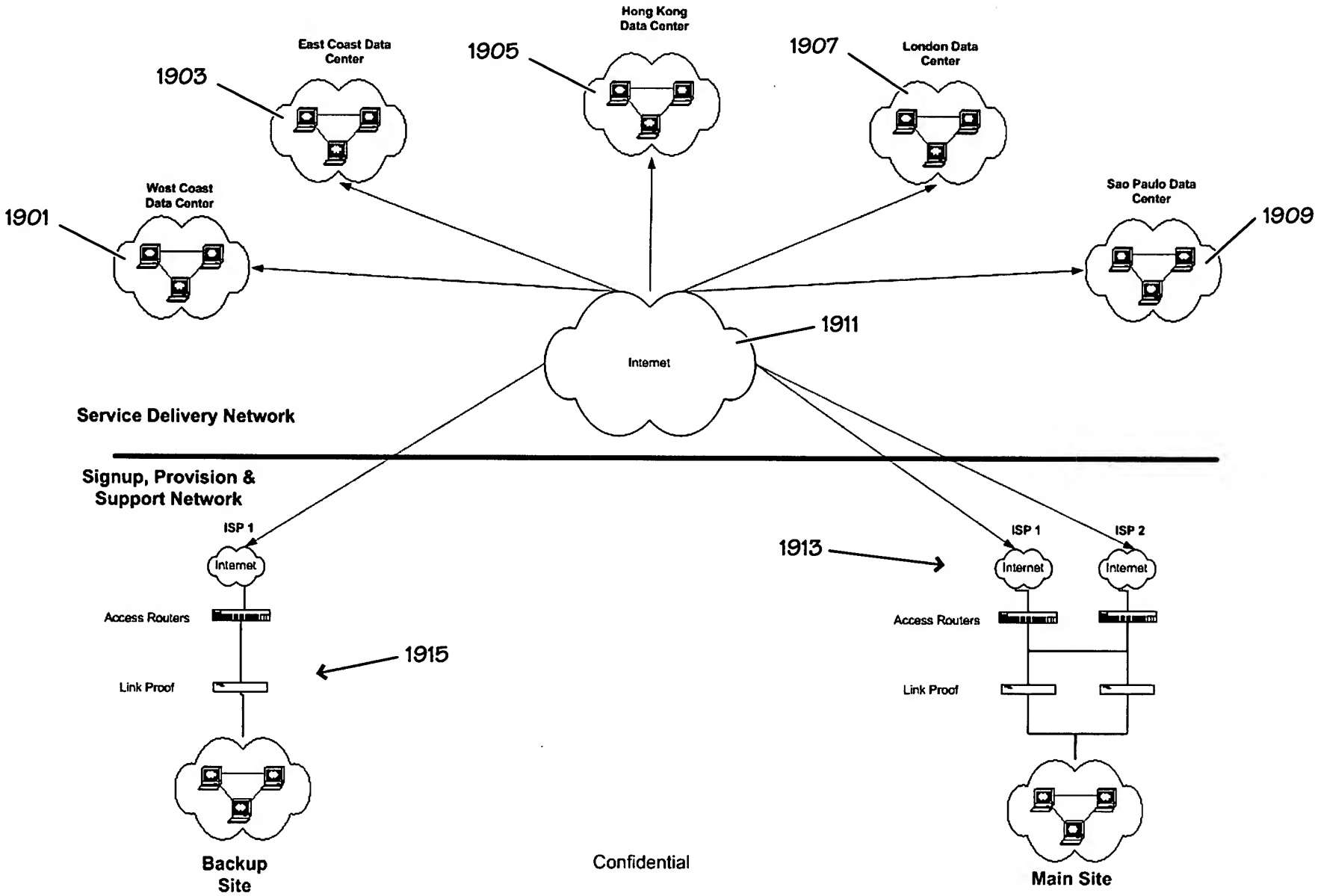

1801
Application Module
1803
Multi-Layer Network Interface Module
1871
1805
1851
Version Control
1853
Subscription Management
1807
Utility Server(s)
1809
Authentication Server (s)
1820
Browser (IE, Netscape, AOL)
1822
Email Application (Outlook, Outlook Express)
1824
Instant Messaging (YIM, AIM, MSN, ICQ)
1826
Applications (Kazza, Morpheous, YIM... etc)
1828
Trojans, hackers... etc.
Requested/ Approved Data
Block Decision
URL Filter (http, https, ftp, nntp)
Email Filter (POP3, SMTP, IMAP)
IM Filter (YIM, AIM, MSN, ICQ)
Application Control
Port Filtering/ Intrusion Detection
Anti-Virus w/On Access Protection
1867
V Routing Communication Technique
TCP/UDP Port Control
1811
Content Server(s) (URL, SPAM, Image, Virus)
1813
Requested Content
1815
Hacker, Trojan, Worm, Virus Attack
1817
Reporting Server
1819
Master Content Database
1861
1863
User Interfaces
Content Cacheing
1865
Load Balancing
Error Handling
1859
1857
Activity Reporting
1855
Content Rating

FIG. 18



Confidential

FIG. 19

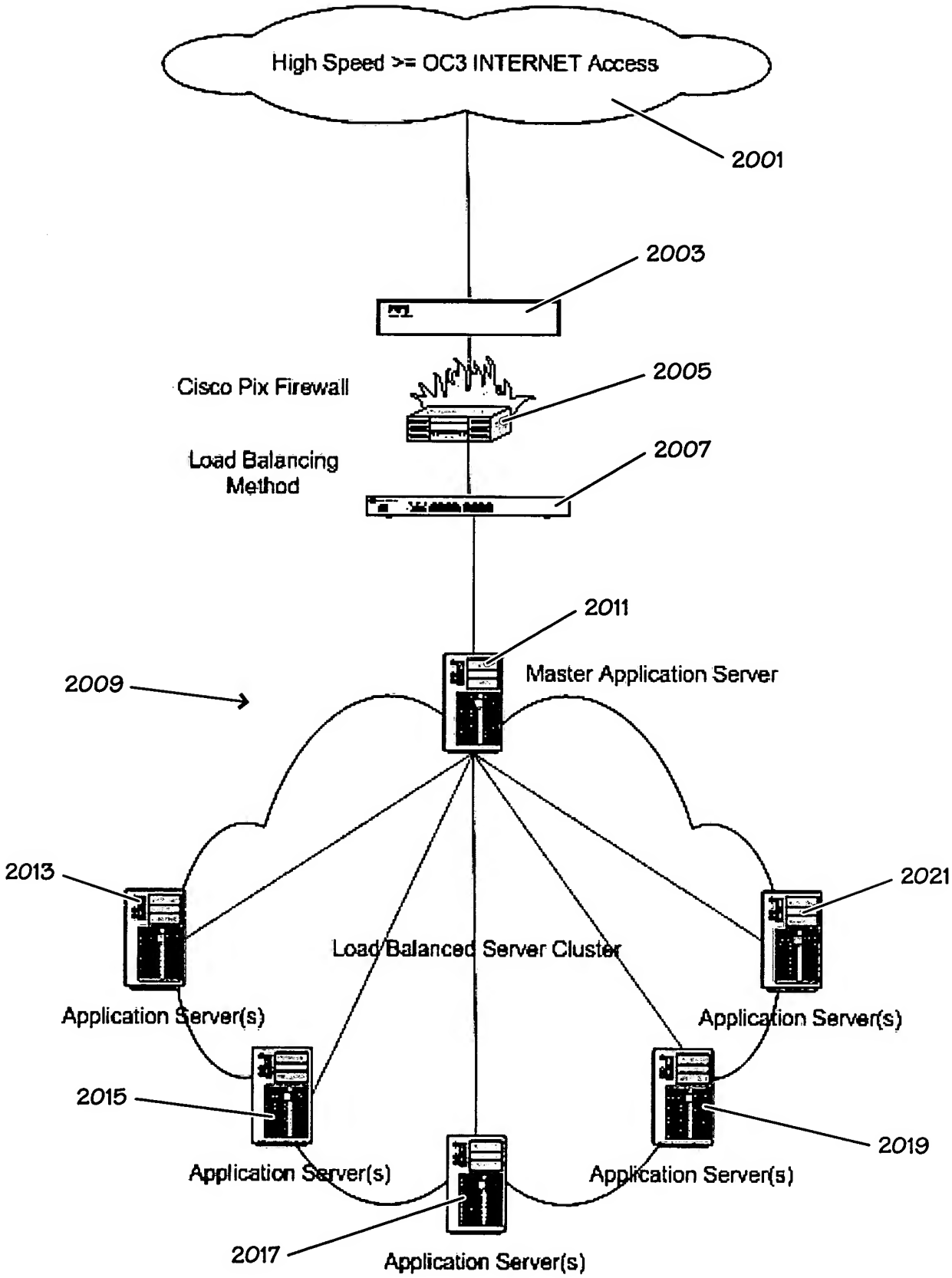

High Speed >= OC3 INTERNET Access
2001
2003
Cisco Pix Firewall
2005
Load Balancing Method
2007
2011
Master Application Server
2009
2013
2021
Load Balanced Server Cluster
Application Server(s)
Application Server(s)
2015
2019
Application Server(s)
Application Server(s)
2017
Application Server(s)

FIG. 20

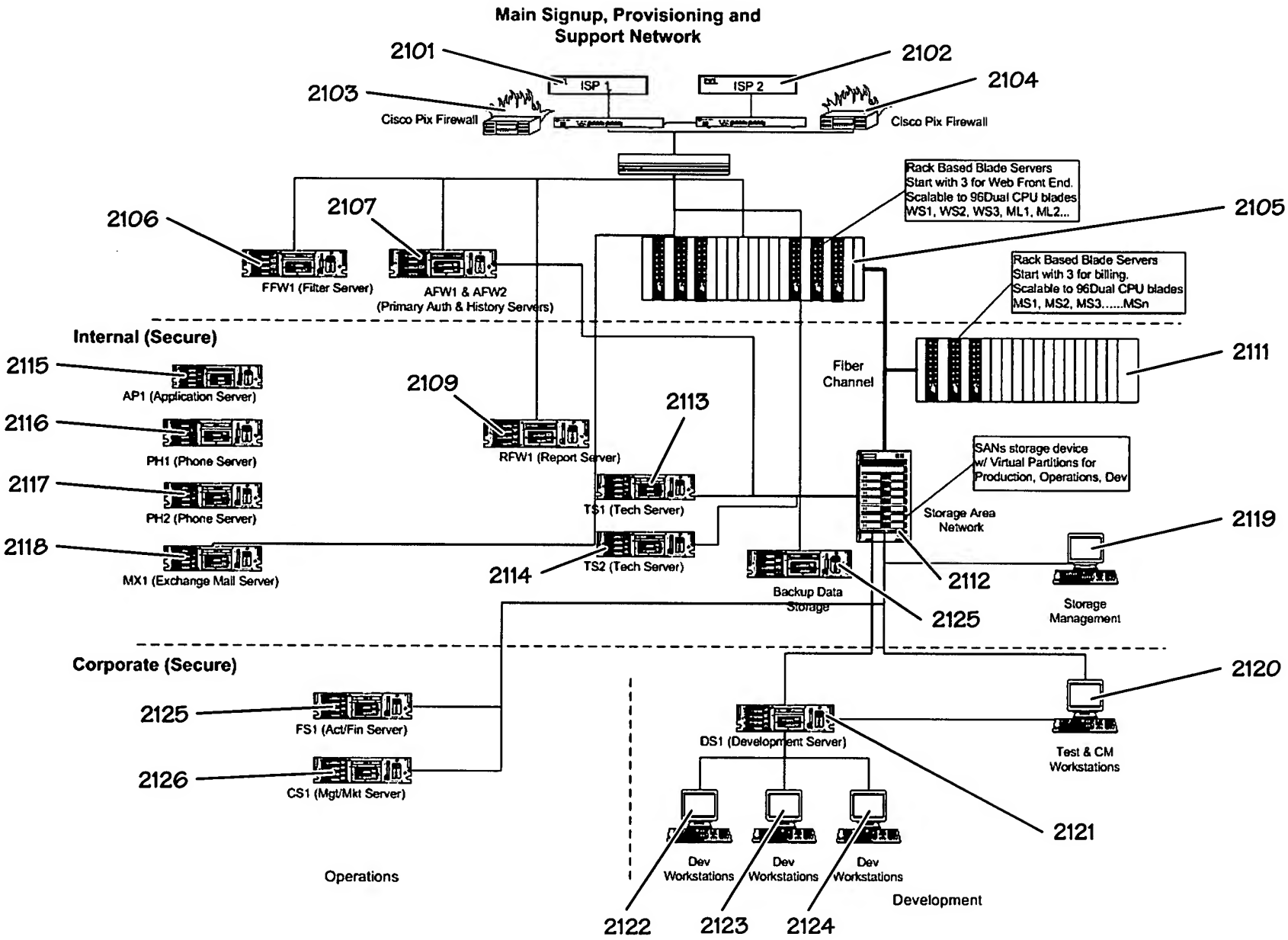

Main Signup, Provisioning and Support Network
2101
2102
2103
2104
ISP 1
ISP 2
Cisco Pix Firewall
Cisco Pix Firewall
Rack Based Blade Servers Start with 3 for Web Front End. Scalable to 96Dual CPU blades WS1, WS2, WS3, ML1, ML2...
2105
2106
2107
FFW1 (Filter Server)
AFW1 & AFW2 (Primary Auth & History Servers)
Rack Based Blade Servers Start with 3 for billing. Scalable to 96Dual CPU blades MS1, MS2, MS3.....MSn
Internal (Secure)
2111
Fiber Channel
2115
AP1 (Application Server)
2109
2113
2116
PH1 (Phone Server)
RFW1 (Report Server)
SANs storage device w/ Virtual Partitions for Production, Operations, Dev
2117
PH2 (Phone Server)
TS1 (Tech Server)
Storage Area Network
2119
2118
MX1 (Exchange Mail Server)
2114
TS2 (Tech Server)
Backup Data Storage
2112
2125
Storage Management
Corporate (Secure)
2120
2125
FS1 (Act/Fin Server)
DS1 (Development Server)
Test & CM Workstations
2126
CS1 (Mgt/Mkt Server)
2121
Dev Workstations
Dev Workstations
Dev Workstations
Operations
Development
2122
2123
2124

FIG. 21

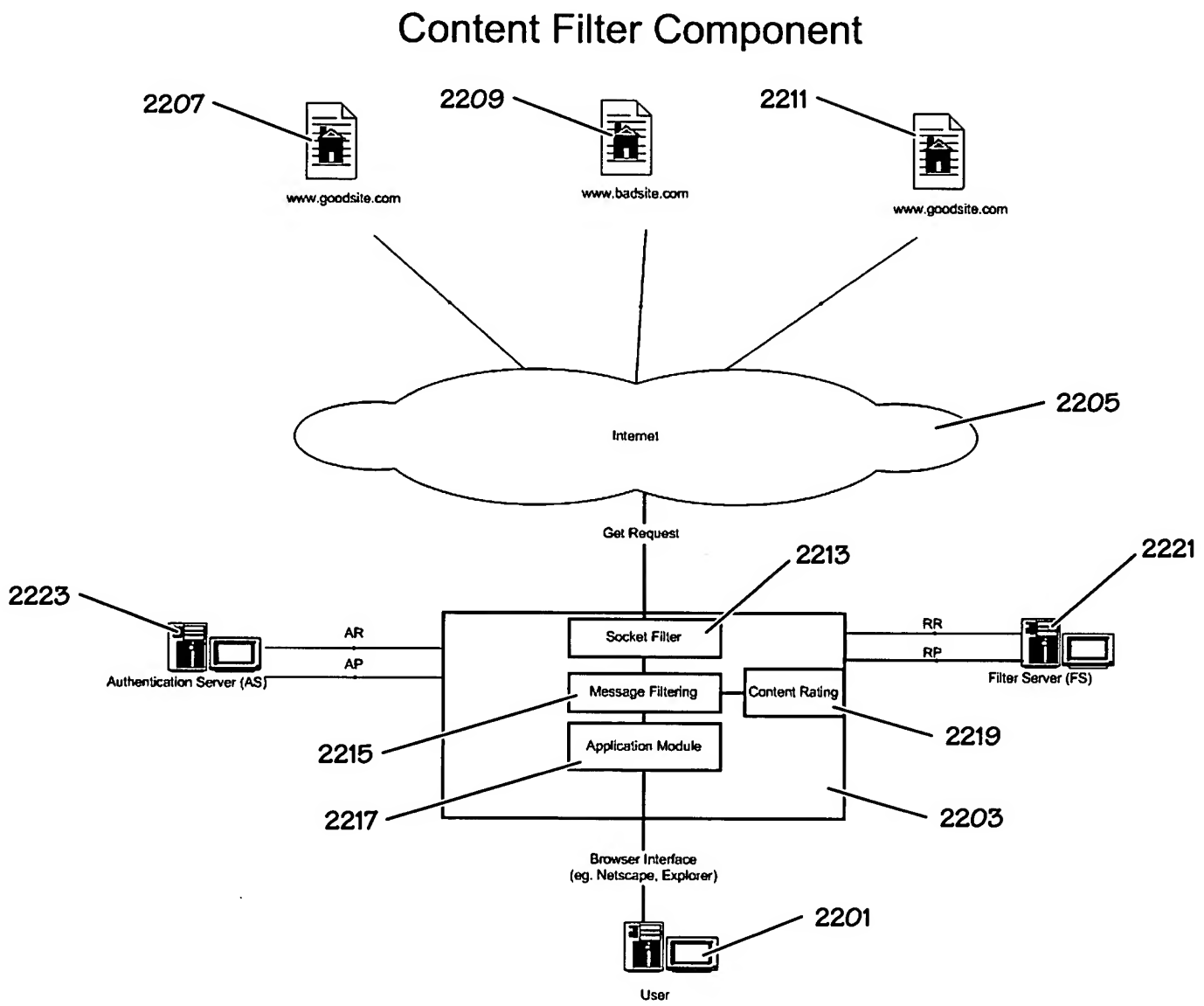

Content Filter Component
2207
2209
2211
www.goodsite.com
www.badsite.com
www.goodsite.com
2205
Internet
Get Request
2213
2221
2223
Socket Filter
AR
AP
RR
RP
Authentication Server (AS)
Filter Server (FS)
Message Filtering
Content Rating
2215
2219
Application Module
2217
2203
Browser Interface
(eg. Netscape, Explorer)
2201
User

FIG. 22

Personal Firewall Component

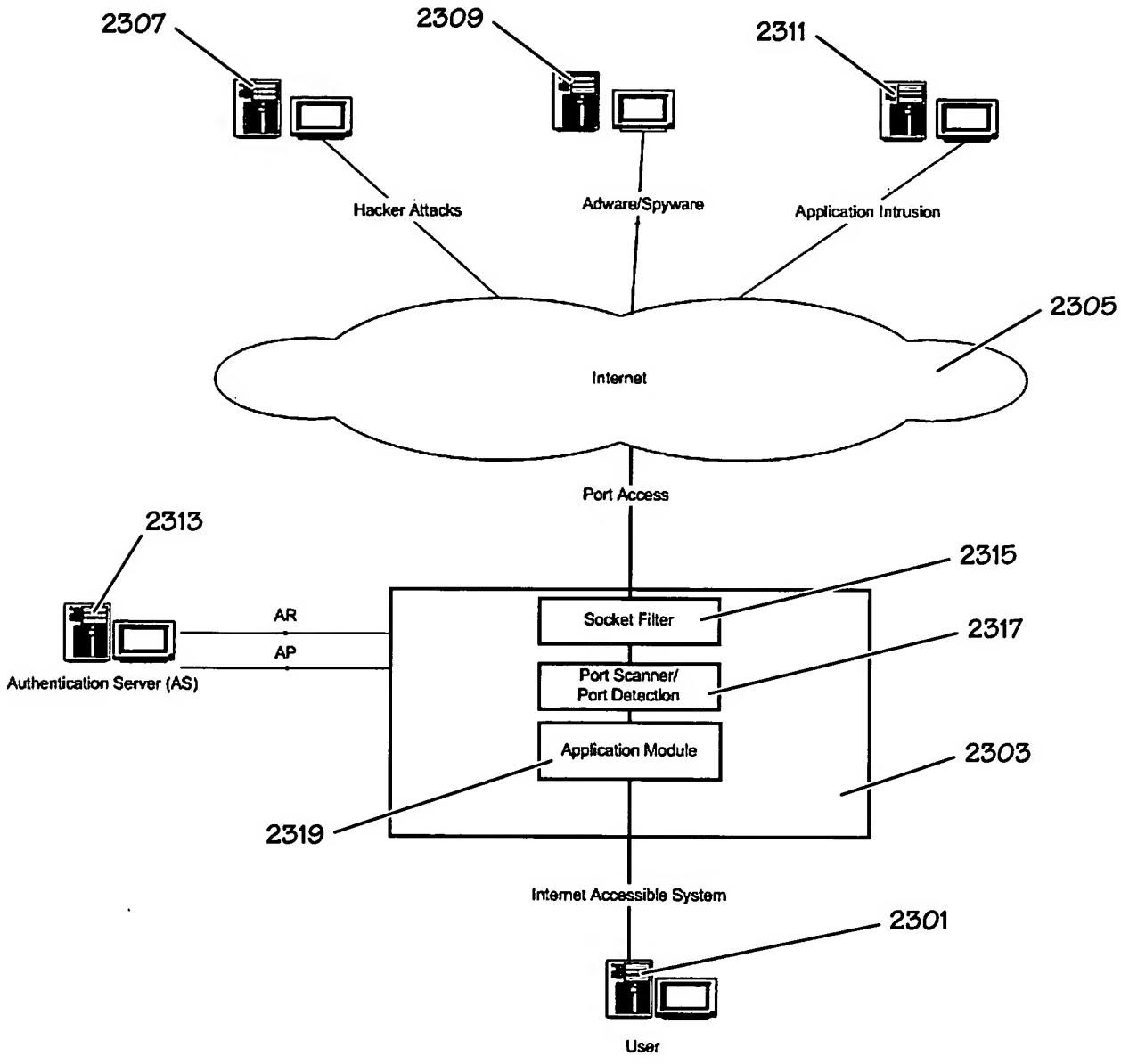


FIG. 23

Activity Reporting Component

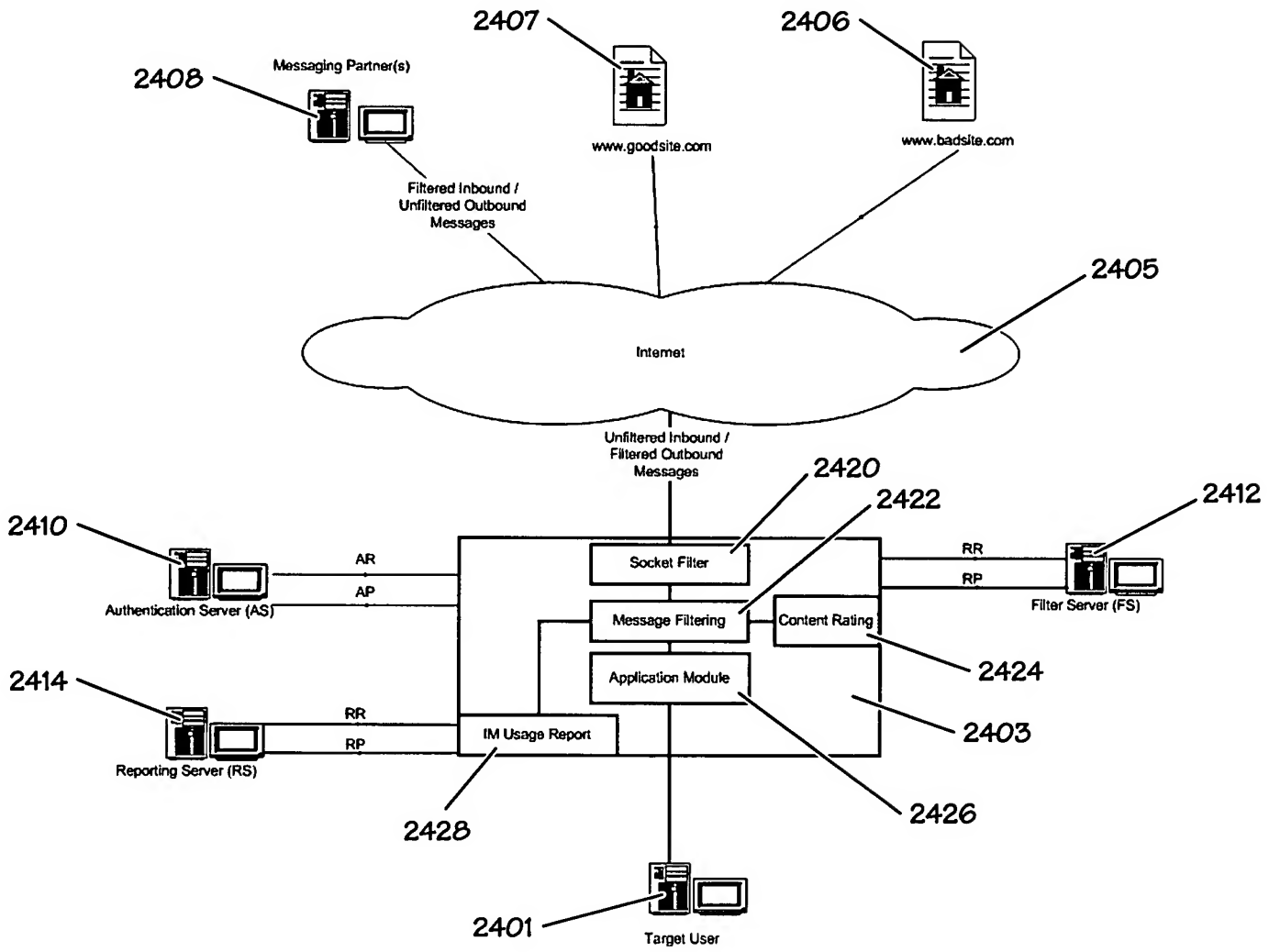


FIG. 24

Anti Virus Protection Component

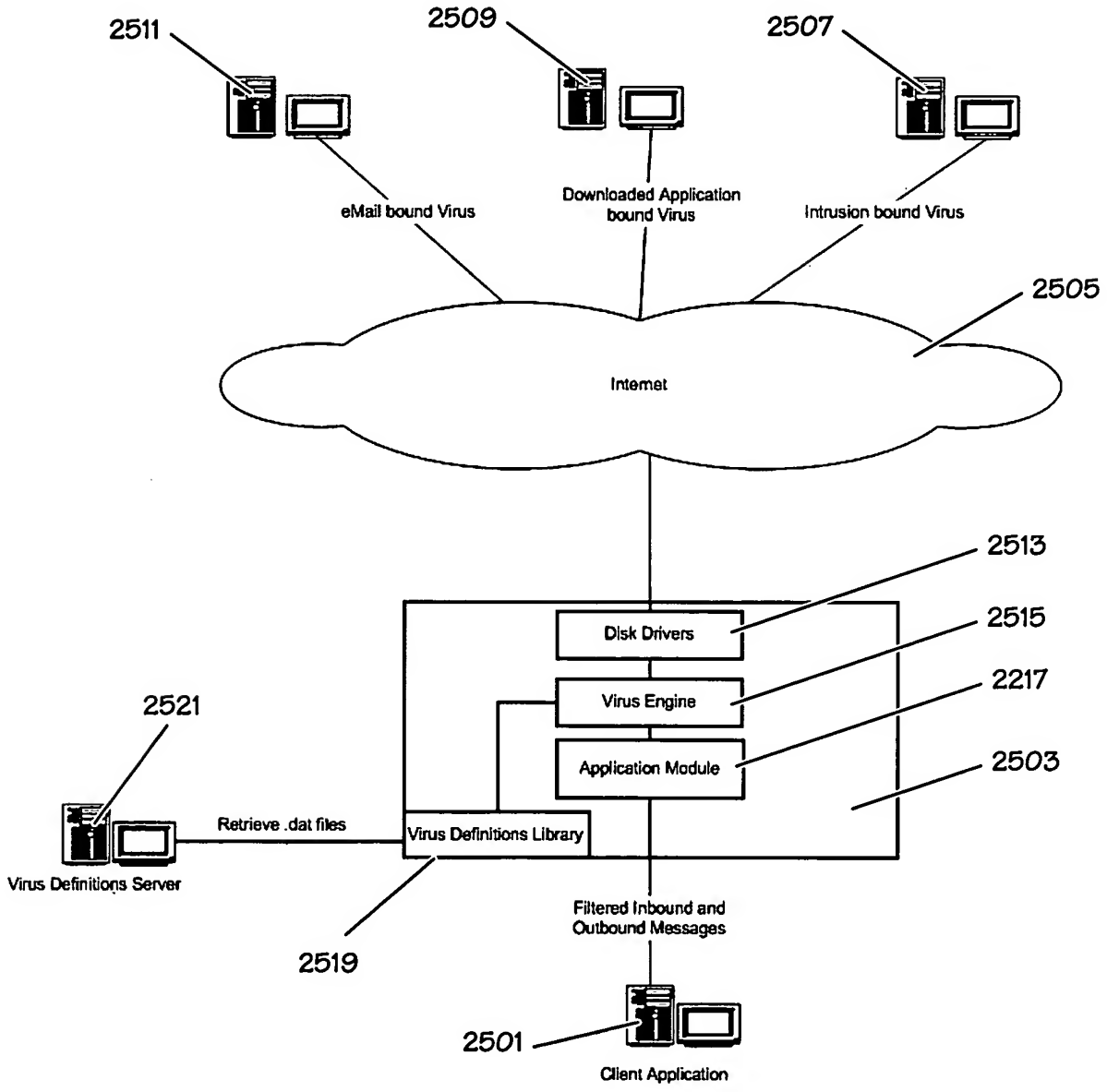


FIG. 25

Instant Message Filter Component

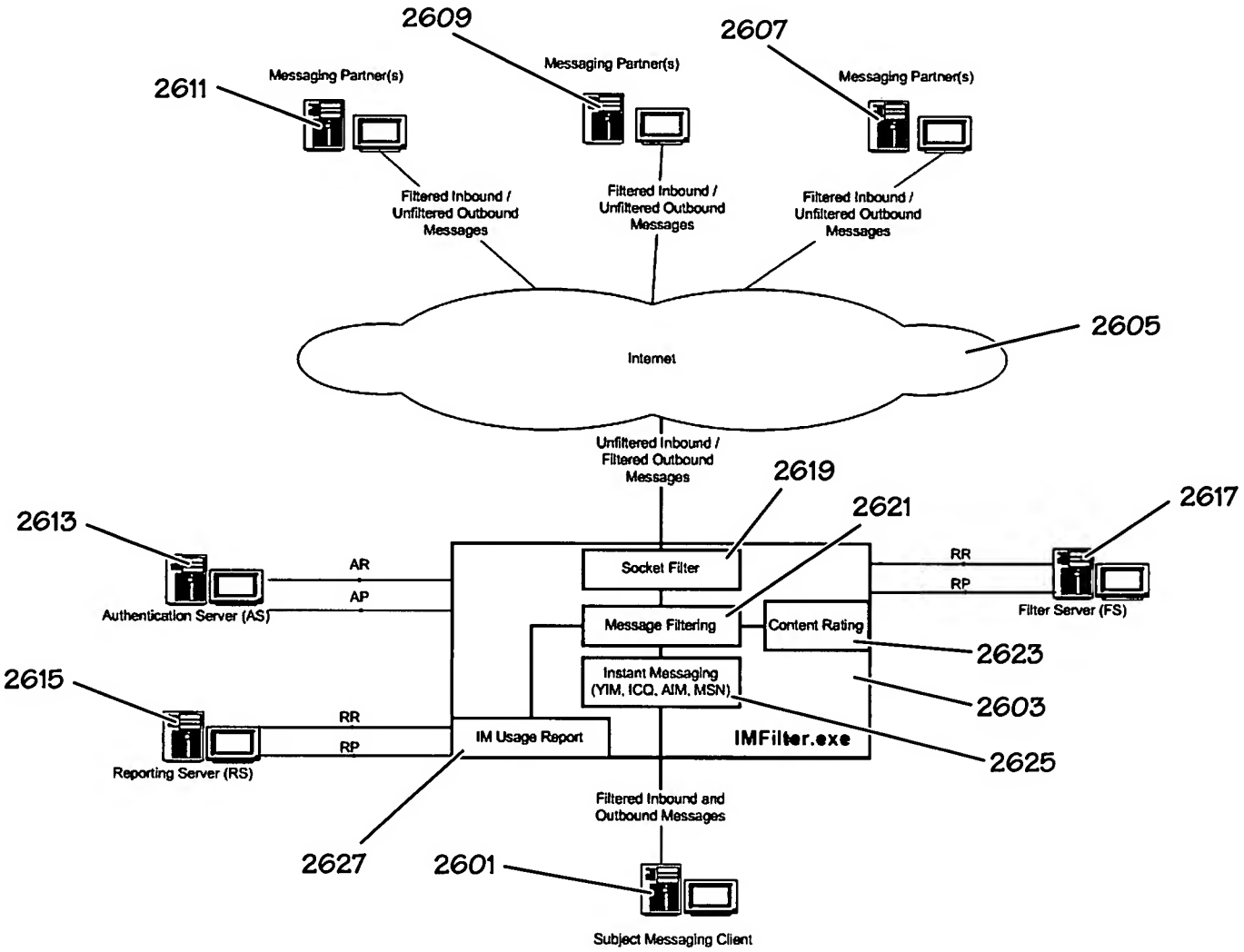


FIG. 26

SPAM Filter Component

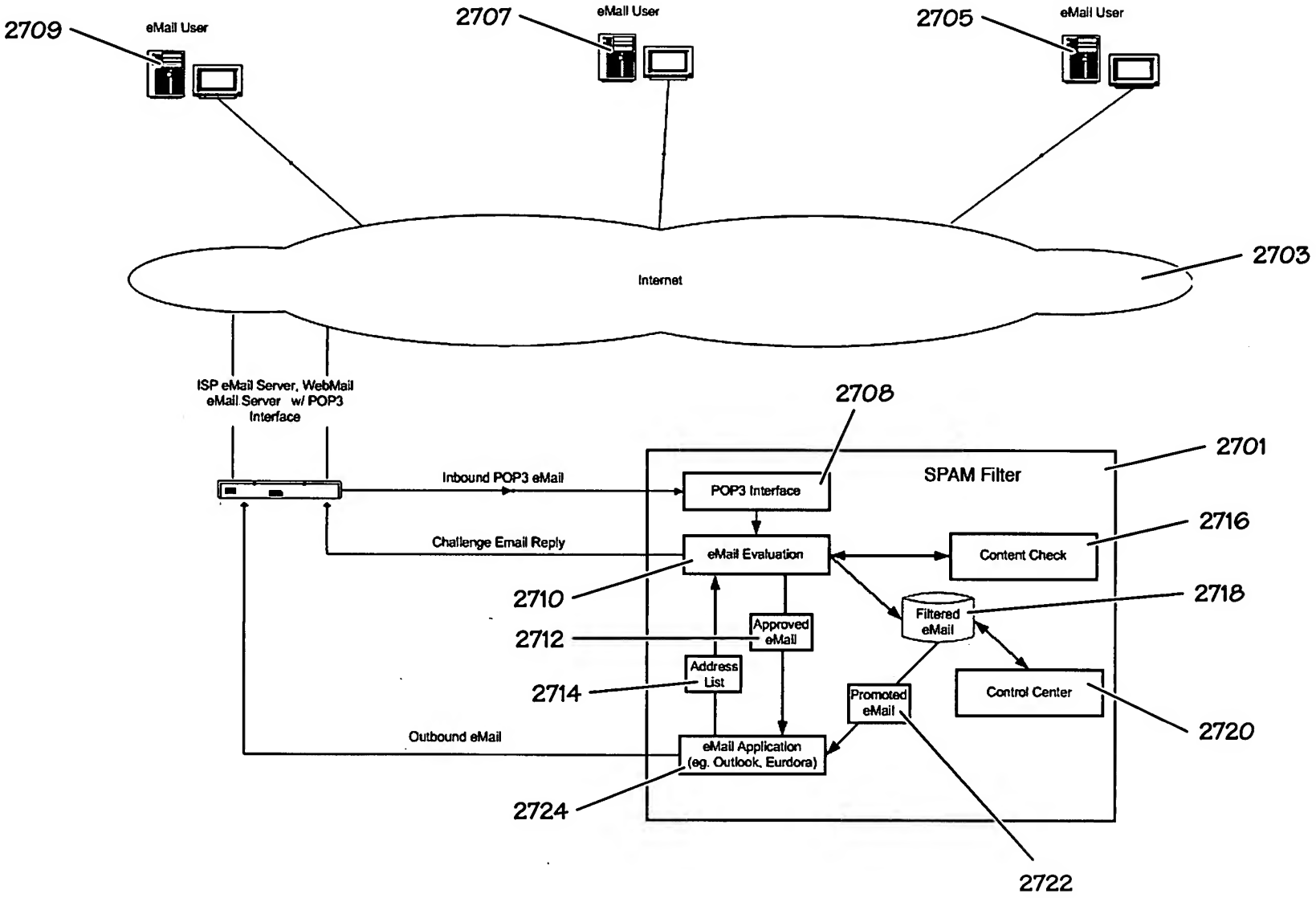


FIG. 27

Accountability System - Multi-User Report

John Doe **LOGGED IN**

MULTI-USER REPORT CONSOLE ?

Welcome to the Multi-user Console, where you can view NetAccountability log information for many users at once. Here we list the top 10 URLs for each person in your organization -- regardless of page ranking. In other words, these are the 10 worst -- but assuming that most of your users are keeping clean online, this in most cases will just be a list of the "least good". Each column can be sorted by clicking on that column's header -- and you can turn on and off the "URL listing" feature by clicking on the "+/-" at the top left of the list.

[+] [-]

FIRST NAME	LAST NAME	STATUS	
Allison	Connally	☐	▶ VIEW DETAILED STATS
Mary	Smith	☐	▶ VIEW DETAILED STATS
John	Trump	☐	▶ VIEW DETAILED STATS
Martin	Hatcher	☐	▶ VIEW DETAILED STATS
Walter	Humphrey	☐	▶ VIEW DETAILED STATS
Kelley	Jordan	☐	▶ VIEW DETAILED STATS
Barbara	Paulsen	☐	▶ VIEW DETAILED STATS

FIG. 28

Accountability System - Single User Report

SITES VISITED PRINT

WEDNESDAY

Start Time	Site	Machine ID	Rating	
01:55 PM	[+] ad.doubleclick.net [2]	Laptop	Not Rated	☐
04:06 PM	[+] ads.addesktop.com [5]	Laptop	Not Rated	☐
01:55 PM	[+] amch.questionmarket.com [3]	Laptop	Not Rated	☐
02:06 PM	[+] communications.msn.com [1]	Laptop	Not Rated	☐
03:03 PM	[+] down.plaxo.com [2]	Laptop	Not Rated	☐
01:55 PM	[+] m3.doubleclick.net [2]	Laptop	Not Rated	☐
01:48 PM	[+] news.google.com [8]	Laptop	Not Rated	☐
01:48 PM	[+] pagead2.googlesyndication.com [4]	Laptop	Not Rated	☐
09:26 AM	[+] sa.windows.com [6]	Laptop	Not Rated	☐
01:55 PM	[+] server-us.imrworldwide.com [1]	Laptop	Not Rated	☐
01:48 PM	[+] update.adobe.com [1]	Laptop	Not Rated	☐
01:48 PM	[+] www.crosswalk.com [7]	Laptop	Medium	■
04:06 PM	[+] www.csmonitor.com [1]	Laptop	Not Rated	☐
09:05 AM	[+] www.download.windowsupdate.com [1]	Laptop	Not Rated	☐
01:55 PM	[+] www.forbes.com [1]	Laptop	Not Rated	☐
04:53 PM	[+] www.naf.com [1]	Laptop	Not Rated	☐

FIG. 29